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Vol. 21. No. 5 MAY, 1923

THE METAL INDUSTRY

WITH WHICH ARE INCORPORATED
THE ALUMINUM WORLD: COPPER AND BRASS: THE BRASS FOUNDER AND FINISHER
ELECTRO-PLATERS REVIEW

Entered as second class matter February 10, 1903, at the post-office at New York under the Act of 1879.

A MONTHLY PUBLICATION RELATING TO THE METAL AND PLATING TRADES

SUBSCRIPTION PRICE PER YEAR, UNITED STATES AND CANADA, ONE DOLLAR; OTHER COUNTRIES, TWO DOLLARS. THE METAL INDUSTRY PUBLISHING COMPANY, 99 JOHN STREET, NEW YORK, U. S. A.

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Lacquering — *an art that was never lost*

Lacquer preserved the history of Atefamon

The deeds of Atefamon, Charioteer to the General of the Army, are inscribed on his mummy case.

Thousands of years ago, when proud Egypt flourished during the XXII Dynasty, Atefamon held the reins at his last triumphal entry. And when other hands picked them up, the story of Atefamon was painted on his coffin and *lacquered*, so as to preserve the narrative.

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Vol. 21 NEW YORK, MAY, 1923 No. 5

The Foundry Convention

A Report of the Joint Meeting and Exhibition of Foundry Equipment Held in Cleveland, Ohio, April 28-May 3, 1923

The joint convention of the American Foundrymen's Association and Institute of Metals Division, held in Cleveland, April 28-May 3, was expected to be a success, but proved to be much more so than was hoped for. The attendance was over 4,000 and the number of exhibitors over 200. The exhibits were so arranged as to be easy to see and were very attractively displayed. The scheme of placing all the molding machines and other noisy apparatus in the exhibition hall of the auditorium, which was on a floor below the arena, proved to be entirely successful. Both exhibitors and visitors were very pleased with the results achieved by the exhibit.

NEW PRODUCTS

Concerns which showed products developed recently were as follows:

Arcade Manufacturing Company, Freeport, Ill. Brillon 20th century pouring device, which performs the work of a hoist and traveling crane and can be operated by one man.

C. O. Bartlett & Snow Company, Cleveland, Ohio. Mechanical sand handling, continuous molding and mechanical carrying equipment.

S. Birkenstein & Sons, Inc., Chicago, Ill. Brass and copper forgings.

Foundry Equipment Company, Cleveland, Ohio. Coleman tilting aluminum furnace of the cast iron pot type.

Globe Iron-Crush & Shot Company, Mansfield, Ohio. Steel shot for blasting abrasives.

Hill & Griffith Company, Cincinnati, Ohio. Aluminum flux; Hill-Griffith high temperature furnace cement.

VIEW OF EXHIBITS IN ARENA, CLEVELAND AUDITORIUM, CLEVELAND, OHIO.

Johnston & Jennings Company, Cleveland, Ohio. No. 0 air operated squeeze and jolt squeeze molding machines.

Modern Pouring Device Company, Port Washington, Wisc. One-man pouring device.

C. E. McArthur & Company, Chicago, Ill. Wire straightener for use in brass foundries to cover and straighten wire reclaimed from used molding sands.

S. Obermayer Company, Chicago, Ill. New parting.

J. W. Paxson Company, Philadelphia, Pa. Sand blast machines designed by H. F. Hoevel.

Pittsburgh Electric Furnace Corporation, Pittsburgh, Pa. Electric furnace for use on nickel and Monel metal.

Thomas Special Flux Company, Cleveland, Ohio. Special fluxes for aluminum, brass, etc.

Triumph Electric Company, Cincinnati, Ohio. Triumph squirrel cage motor with an oil immersed starter. Triumph TR motor with push button control.

FOUNDRY TOURISTS.

The party of the American Foundrymen's Association which will take the trip to France to attend the International Foundry Congress in Paris will include the following metal men:

G. H. Clamer, Ajax Metal Company, Philadelphia, Pa.

E. J. Flaherty, Johnson Bronze Company, New Castle.

John Hill, Hill & Griffith Company, Cincinnati, Ohio.

Jesse L. Jones, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

W. S. Quigley, Quigley Furnace Specialties Company, New York.

G. H. CLAMER, PRESIDENT
American Foundrymen's Association

BURGESS DIRECTOR OF BUREAU OF STANDARDS

The news spread quickly of the appointment of Dr. George K. Burgess to the position of Director of the Bureau of Standards, to succeed Dr. Stratton. The Institute of Metals Division took official note of this appointment by telegraphing Dr. Burgess its congratulations and best wishes.

C. E. HOYT, SECRETARY
American Foundrymen's Association

LONG-LIFE MOLDS

An interesting development was outlined by Dr. Moldenke, a "long life mold" as against the so-called "permanent mold." This long-life mold, which may develop into something of real importance to the brass founders, consists of a cast iron backing to a refractory mold material forming the contact surface for the molten metal. It was stated that at the plant of the Holly Carburetor Company, of Detroit, 10,000 castings had been made in one mold.

NEW OFFICERS

New officers of the American Foundrymen's Association were elected in accordance with the nominations noted in THE METAL INDUSTRY for April, 1923. G. H. Clamer of the Ajax Metal Company, Philadelphia, Pa., was elected President, and H. B. Swan, Cadillac Motor Company, Detroit, Mich., Vice-President. L. W. Olsen of the Ohio Brass Company, Mansfield, Ohio, remains a director, having been elected last year for a three-year term. Thomas W. Pangborn, Pangborn Corporation, Hagerstown, Md., was elected a director.

Papers Read at the Meetings

LINEAR CONTRACTION AND SHRINKAGE OF A SERIES OF LIGHT ALUMINUM ALLOYS

BY ROBERT J. ANDERSON, BUREAU OF MINES, PITTSBURGH

This paper is issued as a contribution to the literature on the metallurgy of the light aluminum alloys, and is based on an investigation carried out in the Bureau of Mines. Experiments were carried out to determine the linear contraction of a series of 40 light aluminum alloys on pouring into chill molds and sand molds with a view to obtaining data to be used in making pattern allowances. Of the alloys examined, the linear contraction was found to vary roughly between 0.95 and 1.80 per cent. The more theoretical aspects of the problems involved in the study of contraction are discussed in the paper, and figures are given for the contraction of the 40 alloys when cast under different definite conditions. The effects of various factors upon the resultant contraction of a given alloy are discussed, and an extensive bibliography giving references to papers dealing with the contraction and shrinkage of alloys is appended.

DENSITY OF MAGNESIUM FROM 20° TO 700° C.

BY JUNIUS D. EDWARDS & CYRIL S. TAYLOR, PITTSBURGH, PA.

Magnesium is the lightest metal used for structural purposes, for which reason, perhaps, more than usual interest is attached to measurements of its density. Although the density of solid magnesium has been determined frequently, no measurements of the density of the liquid metal are available. Because of unusual experimental difficulties in measuring the density of the liquid, only a limited number of measurements of good precision were secured. The results, especially the value for the crystallization shrinkage, are of great interest in connection with the casting of the metal.

TABLE 2—DENSITY OF MAGNESIUM FROM 20° C. TO 700° C. (PURITY OF MAGNESIUM, 99.99 PER CENT.)

Temperature, Degrees C.	Density, Grams Per Milliliter	Kind of Densimeter Used
20	1.7388	
667	1.560	Graphite
667	1.565	Graphite
673	1.562	Steel
711	[1.538?]	Graphite
768	[1.445?]	Graphite
822	[1.478?]	Graphite

Jesse L. Jones asked about the amount of surface oxidation and reaction at high temperatures with air. He also asked the reason for the fact that black spots were found in the molten magesium, whereas magnesium oxide would normally have a gray color.

J. D. Edwards answered that surface oxidation was high. Magnesium oxide should be a bluish gray but the dark spots may be due to a combination of oxide and nitride.

RECENT PROGRESS IN THE APPLICATION OF THE ALUMINUM ALLOY ALPAX IN THE FOUNDRY

BY R. DE FLEURY, FRANCE

(Annual Exchange Paper Submitted by the Association Technique de Fonderie)

The author discusses the properties and uses of the aluminum alloy alpax. The alloy of aluminum and silicon when treated with certain alkaline salts is said to have physical properties much superior to the usual foundry aluminum alloys. The development of the use of this material in France during the last year and a half is said to have demonstrated its practicability for many automobile parts. Because of its lightness, great strength and low coefficient of expansion and contraction, it is being used for cylinders, pistons, connecting rods and other auto castings. The author gives discussions in detail of his observations of the tests conducted on this material.

Jesse L. Jones stated that Alpax had made real advances in France and Germany because of its various advantages, among which was ductility.

W. A. Cowan said that so far as he knew, Alpax was not used directly as a bearing metal, but in place of the brass shell which was lined with babbitt. He had seen a rough test made and found that it tended to seize the axle, and on the whole was not as good as bearing bronze.

Mr. Willis said that in a test he had seen a shaft 7/64th of an inch in diameter revolving at 10,000 r. p. m. for 500 hours wore a bearing made of Alpax only 1/10,000th of an inch.

D. Basch said that Alpax with about 13 per cent silica was a good foundry proposition because of its simplicity in handling, its high resistance to salt water corrosion, its high elongation, tensile strength and low shrinkage. It did, however, lack stiffness. Its proportional limit was only 6,000 pounds as against 8,000 pounds for No. 12 alloy and 15,000 for the heat treated and aged aluminum alloy carrying 4 per cent copper and .3 per cent magnesium. Alpax is not a cure-all.

The low silicon alloy about 5 per cent is well known. It requires no refining and is very easy to cast. There are at the present time one or two concerns in the United States using it, such as the Precision Die Casting Company, Syracuse, N. Y., which uses the low silicon mixture, and the General Aluminum & Brass Company of Detroit, using the high silicon mixture.

R. J. Anderson stated that the paper should be revised before being included in the transactions, since it was not clear in a number of places, and moreover made certain misstatements, such as the one that an alloy of aluminum of the duralumin type was already in almost universal use in America for connecting rods.

J. D. Edwards explained that the low shrinkage of Alpax was caused by the fact of silicon expanding on freezing and thus counteracting the contraction of aluminum.

LINEAR CONTRACTION OF A SERIES OF BRASSES AND BRONZES

BY ROBERT J. ANDERSON, BUREAU OF MINES, PITTSBURGH, AND EVERETT G. FAHLMAN, THE NATIONAL SMELTING CO., CLEVELAND

This paper is issued as a contribution to the literature of nonferrous alloy foundry practice and is based on an investigation carried out by the bureau of mines in connection with its nonferrous metallurgical work. Experiments were carried out for the purpose of determining the linear contraction of a series of brass and bronze alloys on casting into sand molds with a view to obtaining data to be used for making allowances in the production of nonferrous alloy castings. The linear contraction of the alloys noted varied roughly from about 1.1 to 2.2 per cent, depending upon the chemical composition and other factors. It was noted that high temperature pouring yielded less contraction than low temperature pouring. Other conditions being identical, the smaller the cross section, the less the contraction within certain limits. The extent to which piping occurs on casting an alloy is a factor in determining the suitability for casting purposes, since piping is an indication of the contraction in volume.

EFFECT OF HEAT TREATMENT ON RELEASE OF STRESS IN BRONZE CASTINGS

BY R. J. ANDERSON, BUREAU OF MINES, AND C. E. ELDRIDGE, METROPOLITAN MUSEUM OF ART, NEW YORK

This paper which had not been re-printed, was read by Mr. Anderson. It seems that the common method of aging bronze castings was to leave them on the shelves for several months (the typical bronze casting referred to was of 87 copper, 7 tin, 5 zinc and 1 lead). The work attempted was the speeding up of this aging process by annealing. It was found that by heating for an hour at 550° C. most of the strains should be removed. A longer time of heating at 400° C. might also bring about the same results. The time and temperature for each job would have to be determined experimentally.

THE COHESIVENESS TEST OF FOUNDRY SANDS

BY H. RIES AND C. M. NEVIN, CORNELL UNIVERSITY, ITHACA, N. Y.

The authors discuss data obtained regarding the bonding strengths of molding sands. The purpose of the investigation was to obtain a method of securing comparable data of the cohesiveness properties of various foundry sands. The method used was that described by R. J. Doty at the 1922 meeting of the American Foundrymen's Association with, however, a different method of ramming the sand specimen. The method of ramming used was to ram the sand by a 20-pound weight dropped from a definite height. The per cent of water in the sand is shown to be an important factor in bond strength, in some sands a variation of one per cent in the total moisture content gives a great difference in cohesiveness. This method is recommended by the Joint Committee on Molding Sand Research.

PERMEABILITY TEST FOR SAND

BY THE JOINT COMMITTEE ON MOLDING SAND RESEARCH

The term "permeability" as used in this test, is that physical property of sand which permits the passage of gases. It is upon this property of permeability that the venting qualities of sand molds and cores depend. A sand of high permeability has good venting quality because of its "openness." The natural characteristics of the sand and its binders, the density with which these are packed, and the percentage of moisture used for tempering, are important factors in regulating the degree of permeability. The object of the permeability test is to determine the rate of the flow of air per unit pressure through a standard specimen of sand.

The water flows from a reservoir-bottle (A) into a

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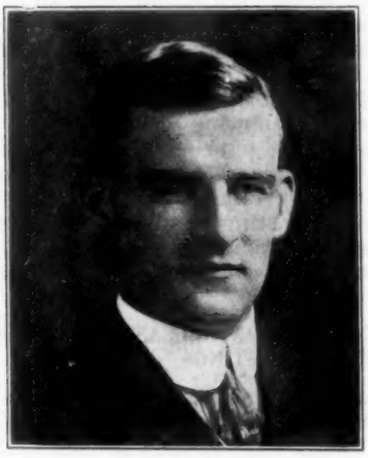

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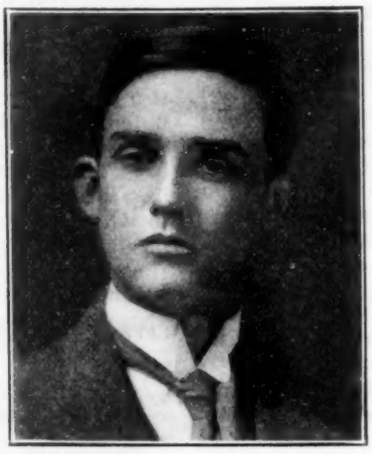

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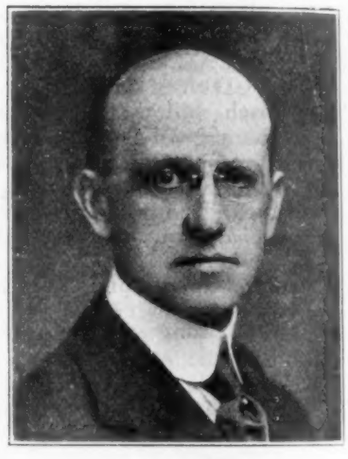

W. A. COWAN

H. M. LANE

E. E. THUM

H. M. WILLIAMS

displacement-bottle (B), thereby forcing the air from bottle (B) through the system, and on through the sand specimen in container (E). The resistance of the sand sets up a pressure in the system. This pressure is indicated by the manometer (C). The volume of air forced through the sand specimen is shown by the change in the water level on gauge (D).

Permeability equals the cubic centimeters of air forced through the sand specimen, multiplied by the height of the sand specimen in centimeters; divided by the pressure in grams, multiplied by the area of the sand specimen in square centimeters; divided by the minutes of time. Thus:

$$\text{Permeability} = \frac{\text{cm}^3 \text{ of air} \times \text{cm height of specimen}}{\text{grams pressure} \times \text{cm}^2 \text{ area of specimen}} \div \text{minutes.}$$

FINENESS TEST FOR SAND

BY THE JOINT COMMITTEE ON MOLDING SAND RESEARCH

A given amount of sand is weighed out, dried, the bond (if there is any) removed with sodium hydroxide solution, and run through a series of screens or sieves varying in openings from U. S. Bureau of Standards Nos. 6 to 270. The sand is shaken on these screens for from 15 to 30 minutes, the sand remaining on each sieve weighed and expressed in percentage of the whole.

A PHYSICAL TEST FOR FOUNDRY SAND

BY EUGENE W. SMITH, THE CRANE COMPANY, CHICAGO

The author first discusses the common foundry practice of holding conferences to determine the reason for casting losses and then he advocates the policy of having conferences of the interested shopmen before the starting actual production work on an order for castings, to anticipate possible losses, good equipment, good metal and good sand are stated to be the three principal essentials in producing good castings. Of these three essentials the author then discusses the proper selection of good foundry sand and how the sand should be checked by daily tests. A simple test, to determine the fitness of the sand for various classes of castings, is described.

METHOD OF MAKING VIBRATORY TEST

Use a 10 or 12 ounce clear glass bottle, 1¾ inch in diameter, 6 or 8 inches high. The same as in common use for oil samples.

Rub the sand lightly to remove the lumps. Fill the bottle one quarter full of the material to be tested.

Fill the balance with clear cold water and shake thoroughly.

Stand the bottle on any foundry vibrator plate, hold down firmly and vibrate until the heavy grains are all down. Then allow it to stand until the water becomes clear. The bond and silica will be found divided by a distinct line.

Provide a small rule, the inches divided in tenths

When the solution is fully settled measure the total, then measure the bond, or upper part, following by the silica at the bottom.

Divide each by the first figure. The result will be the percentage of either.

The presence of "yellow" will indicate alumina oxide and "red" the iron oxides. Sometimes both are distinctly shown in the sample, but in most cases their presence is only shown by the varying shades.

The fineness may be easily determined by general observation.

Mr. Smith felt that the committee had done him an injustice in stating that his test was of no value. It was explained to him, however, that the committee had not made such a statement, but had simply noted that his test was of value in determining the proportion of fines to silica as separable by water. This was not a true measure of bond and, therefore, for this purpose was not dependable. Considerable discussion ensued and the consensus of opinions throughout the meeting seemed to be that although Mr. Smith's test was of great value to the foundry foreman in getting a quick check on his sand, it was not an accurate, scientific instrument as were the devices developed by the committee.

Attaching Abrasive Discs

Q.—What is the best method to apply in attaching abrasive discs to steel wheels. We have trouble with the discs coming loose while being used.

A.—Before a new abrasive disc is applied to a disc wheel, the latter should be clean and dry. It the disc wheel is greasy it should be cleaned before applying the cement by washing in a rather strong and hot solution of potash of concentrated lye and rinsing with hot water. Do not apply the glue or cement until it is thoroughly dry. The disc wheel should remain in the press from 15 to 45 minutes, depending on whether glue or cement is used. The wheel should be allowed to dry thoroughly after being taken from the press and before using. Artificial heat should not be used for drying. Ordinary patternmaker's glue can be used for attaching discs but the special wheel cements sold by disc grinder manufacturers are generally considered more satisfactory. To remove worn out discs, immerse the wheel in water. The discs should be stored in a cool, dry place. They should be kept free from oil, grease or water and not subjected to dry artificial heat, especially heat from direct steam radiation, as this will injure the bond, causing the cutting particles to shell off when in service.—P. W. BLAIR.

The Production and Heat-Treatment of Chill-Castings in an Aluminum Alloy ("Y")*

BY W. ROSENHAIN, S. L. ARCHBUTT AND S. A. E. WELLS

Heat-treated chill-cast rods of the "Y" alloy have been found, from time to time, to give tensile tests showing an ultimate stress of 21 tons per sq. in., combined with an elongation of 5 to 6 per cent on 2 in. While these tests indicated the remarkable capacity of this alloy to attain great strength after heat-treatment, their value for practical purposes was considerably reduced by the fact that such results could not be obtained with complete regularity. The endeavor to eliminate this irregularity has led the authors to make detailed study of the process of chill-casting so far as rods 1 in. diameter are concerned. The results obtained are regarded as very satisfactory, since it is now possible to prepare chill-cast rods of this alloy which regularly give values of tensile strength exceeding 20 tons per sq. in. The principle which has been revealed by the detailed study of such castings must be applicable to chill-castings or die-castings of any kind, whether made of this particular alloy or of other materials. The present paper may therefore be regarded not only as a study of the properties of the "Y" alloy in the form of chill-castings, but as a contribution to the detailed study of the factors governing the properties of chill-and-die castings generally.

*Read at the Meeting of the British Institute of Metals, March 7-8, 1923.

Casting Bronze Tablets

The Important Details to Be Observed in Casting Bronze Tablets in a Commercial Foundry Are Explained, Attention Being Called to the Points to Be Considered in Each Step of the Molding Methods—Pouring, Cleaning and Aging Are Also Discussed*

By JACOB G. KASJENS, Brass Foundry Company, Peoria, Ill.

The casting of a bronze tablet is a very high grade piece of work and it is essential that careful attention be given to the flask, sand and every detail of the operation.

FLASK

The cost of making a tablet is so great that one is justified in using a high grade flask. For a tablet about 20 inches wide by 30 inches long in size a flask 35 inches wide by 40 inches long, inside measurements, should be used, the depth of the drag being six inches and the depth of the cope eight inches. Three-inch lumber should be used for such a flask and the corners should be well braced with angle iron. There should be three tie rods in the cope and a similar number in the drag. Bars should be fitted in the cope only. The guide pin should be well fitted and if a crane is available there should be a trunnion on each end of the flask.

SAND

Any good sand that is suitable for other fine brass work can be used for making tablets. It should be prepared the day before it is used. First, put it through a No. 10 sieve, adding about one part of kordex core compound, or any other good core compound, to 40 parts of sand. Sieve again through the same mesh so as to thoroughly mix the compound with the sand, then dampen to the required moisture and sieve through a No. 4 sieve. The sand and compound by this time should be well mixed and the heap should be covered overnight by well dampened gunny sacks. This will give a strong, mellow mixture which will not require brads to hold the particles of sand between the letters.

RAMMING

When the match is prepared and the pattern in place a very small amount of lycopodium should be shaken upon the pattern. Any excess lycopodium should be blown off the pattern or it will cause trouble when spraying the mold, as lycopodium has no affinity for water. Now, put the drag in place, and to avoid "ramming away" from the letters or edge of the tablet, ram the facing sand by gravity as follows:

If a crane and electric riddle are available, hoist the riddle 10 or 12 feet high. If no crane is at hand a step ladder can be utilized. Sieve about an inch of facing sand upon the pattern, then use a coarser sieve and finally fill the drag from the same height. Peen around the ends and sides of the flask. Step off the mold and butt ram it. Before putting on the bottom board vent freely with a wire of medium size to within a half inch of the pattern. In ramming the cope, set a small sprue at each end for pop gates and a large sprue on each side, in the center, for pouring. Use about three-fourths inch of facing sand, then fill in with other sand and ram it in the ordinary way. It is not necessary to ram the cope by gravity, there being nothing to "ram away" on the back of the tablet. Vent the cope in a similar manner to the drag.

LIFTING THE PATTERN AND SPRAYING THE MOLD

Secure the pattern so as to lift it with the cope, raising it very slowly to allow for breaking the vacuum. The gates to the casting should be about 5/8-inch wide by 3/8-inch deep and they should be about 1½-inch apart. It is not necessary to flour the mold. It should be sprayed, however, with molasses water. Use one part of molasses to 15 parts of water and heat until thoroughly mixed. Use the ordinary foundry spray can with 60 to 80 pounds of air pressure. The can should be far enough from the mold and held high enough, so that the molasses water will reach the mold in the form of a mist. About two quarts of the spray mixture should be used on the drag of a mold for a 20-inch by 30-inch tablet and about half this quantity for the cope.

DRYING

It will not be found necessary to dry the molds in the oven, but this can be done by means of a gas torch. The drying process should not be allowed to proceed too rapidly, thus avoiding blistering the face of the mold and burning the pyramids of sand.

CLAMPING THE MOLD

Before closing the mold plenty of paste should be used on the joints of the flask to avoid run outs. Clamp the flask carefully and then place an iron rail or I-beam across it, fitting wooden edges between it and the bars in the cope, so that the sand in the center of the cope cannot rise during pouring.

POURING

On a tablet of the size mentioned above two crucibles should be used for pouring. Where tablets of a greater area are made additional crucibles should be used so as to cover the required area with safety. Unless this precaution is taken strained or mis-run castings will result.

ALLOYS

Any standard art bronze alloy will run well and make a good casting. In some cases it may be necessary to use a special mixture in order to match the color of bronze work already in place.

MELTING

Whether the melting is done in crucibles or open flame furnaces care should be exercised to avoid overheating the metal. It should at all times be covered with charcoal.

CLEANING CASTINGS

When a casting is taken from the mold it should be examined by filing a number of letters several places on the face of the border in order to ascertain whether it is free from pinholes. If the casting is found to be sound the gates can then be removed and the casting cleaned.

FINISH

In finishing the casting the border surface is filed straight, the letters are faced and then draw-filed to take out the waves.

COLORING OR AGING

In order to thoroughly clean the face of the tablet and give the acid dip an opportunity to act uniformly the casting should be cleaned by the sand blast before starting the coloring process. It requires considerable skill and experience to bring out the beautiful color desired.

FINAL FINISH

For the final finish fine emery paper fitted to a block of wood is used and all polished surface rubbed one way to

*Reprinted from a paper presented at the Annual Convention of the American Foundrymen's Association in Cleveland, O., April 28-May 3, 1923.

eliminate waves. When a tablet has to be placed inside of a building it is lacquered. Tablets that go outside age better and more quickly if not lacquered.

CONCLUSION

The making of tablets in a jobbing foundry requires so much attention and care that it naturally influences the general character of the work done in such a foundry. For this reason it is desirable work, because it will raise the standard of the work done by the foundry along other lines.

This paper was read by E. E. Thum for Mr. Kasjens who had passed away on April 13, 1923. A report of Mr. Kasjens' death will be found on page 210 of this issue.—Ed.

Casting Automobile Aluminum Radiator Shells

The Author Discusses the Shop Methods Which Have Been Used to Successfully Cast Aluminum Radiator Shells, Where High Quality and Finish Are Required—Flask and Machine Equipment, Sand, and Gating Methods Are Described.*

By W. A. MILLS, JR., Alloy Foundry & Machine Corporation, New Rochelle, N. Y.

It seems that in the past aluminum radiator shells have not been favorably considered because of various reasons which have recently been overcome so thoroughly that now it is expected they will come into general big demand because of their light weight, rich appearance and sturdy strength.

Pin holes and lack of luster after the polishing operation were the two big points of contention. The following paragraphs describe the means of overcoming these difficulties and show the practical and economical way of casting aluminum radiator shells where high quality and finish are the important factors.

The equipment required to cast aluminum radiator shells will, of course, depend entirely on the production required. If the production is not large, a single aluminum pattern mounted on a follow board with two or three wood flasks is sufficient. In casting these shells it is the best policy to cast the surface to be polished in the nowel. The nowel should be rammed fairly soft and before placing on the cope the pattern should be rapped so that it may be lifted in the cope. Few, if any, gaggers are necessary if the flask has been well barred. The cope should be rammed fairly hard. If this is done the pattern can be easily lifted in the cope. The mold should be shaken out as soon as possible after casting to prevent cracking.

If big production is required two roll-over jolt pattern draw machines are necessary, one for the nowel and one for the cope. Well ribbed and barred, interchangeable aluminum flasks have been found most satisfactory because of their lightness and durability. With two men on each machine a large production can be obtained.

There is no particular grade of sand necessary, although the following mixture gives a good smooth casting—one-third No. 00 Albany, one-third Windsor Lock and one-third old sand.

Many suggestions have been offered concerning the proper alloy to be used in manufacturing aluminum radiator shells, but experience has proved an alloy consisting of 94 to 95 aluminum and 5 to 6 copper gives the best results for a high polish and a dense casting. The use of scrap aluminum would involve the foundryman in various troubles, such as porosity, cracked shells and a poor finish generally when polished. If aluminum zinc alloy is used small pin holes will show up after polishing as the metal must be poured at a fairly high temperature because of the lightness of the casting.

Gating is very important. A French gate at each end of the shell has given very satisfactory results. This necessitates pouring two up, but it means a lower pouring temperature which gives a more solid casting free from blow and pin holes. The metal should be poured as cold as possible, forcing it into the mold. To give the correct pouring temperature is impossible, as this depends entirely on the thickness of the metal of the shell. If possible, however, the metal should be poured between 1,250 to 1,300 degrees Fahr. It is good practice to have metal covered when melting and to be very careful not to overheat.

There are several shells manufactured that are so difficult to cast that production is out of the question. Therefore, it is good policy for the foundrymen to work with the automotive engineers in designing a shell that is practical to cast on a production basis.

*Reprinted from a paper presented at the Annual Convention of the American Foundrymen's Association, in Cleveland, O., April 28-May 3, 1923.

New Nickel-Iron Alloy

Increase of the speed of transatlantic cable transmission four or five fold was prophesied as a result of the application to that work of a new alloy of nickel and iron the properties of which were reported by Dr. H. D. Arnold, director of research of the Western Electric Company, to the American Physical Society. He heralded the invention as the greatest development in submarine cable practice since the invention of the siphon recorder by Lord Kelvin.

The new metal to which the name "permalloy" has been given is composed of about 80 per cent pure nickel, and 20 per cent pure iron. It is distinguished for its extraordinary magnetic permeability which is under the best conditions 50 times greater than that of soft iron. It is the most easily magnetized and demagnetized of all metals. This gives it remarkable value in work like that of the submarine cable where large magnetic effects are desired from extremely small electric current. It is expected also to be valubale in telephony.

A feature of its peculiar property is that it is very sensitive to heat changes and to mechanical strains and stresses, losing nearly all of its character when stretched and regaining it when the strain is removed. No explanation was offered for the alloy's remarkable property which is apparently not related to any other of its physical constants. In its molecular structure it resembles nickel. Small quantities of chromium or cobalt do not affect it, but a minute quantity of carbon, which when alloyed with iron forms steel, poisons it and reduces the magnetic property enormously.—Science Service.

Wisconsin Foundrymen's Convention

As the first annual convention of the Wisconsin Foundrymen's Association at the University of Wisconsin, in Madison, brass castings were discussed by Prof. E. D. Fahlberg of the University of Wisconsin. He summarized the effect of additions to brass, and as tin, lead, iron, aluminum, antimony, manganese, bismuth, arsenic, cadmium, silicon, phosphorus, copper oxide, zinc oxide, aluminum oxide and silica. All but the first three are said to be injurious to brass and to keep them down the brass founder should sort his scrap.

Briquetting of Brass Turnings

Comparisons of Melting of Briquettes and Loose Turnings*

By F. L. WOLF,[1] Mansfield, O.

As we operate our own machine shop, our foundry has a continuous influx of brass borings and turnings to be remelted. Anyone with experience along this line will tell you that it is expensive to handle and melt these chips, and this question of expense confronted us when the idea of a briquetting machine was directed to our attention. The theory of this machine was excellent. By some adaptation of the hydraulic press we could compress our borings and turnings into briquettes which could be used practically the same as brass ingots. Theoretically this would greatly facilitate handling and melting. In addition, a tremendous amount of money could be saved. We decided to buy one of these machines, but our experience gained from the use of this machine was discouraging. After a survey of the following data you can draw your own conclusions as to whether the results obtained were satisfactory.

SUMMARY

After experimenting with a briquetting machine for several months, we found no economy in melting. We found it rather more convenient to carry briquettes up to the furnace than to carry loose chips but the breakage of briquettes in the furnace was considerable. The data of Table 1 were obtained from ten specific heats with the use of briquettes and without the use of briquettes. All handling and furnace conditions were practically the same.

TABLE I—COMPARISON OF RESULTS, USING LOOSE TURNINGS AND BRIQUETTED TURNINGS. TEST NO. 1

	No. heats	Total metal pounds	Pounds poured	Pounds Loss	Pct. loss	Skim and slag	Metal recovered from slag	Total recovered	Net loss	Pct. loss
Loose borings	5	2608.5	2426.5	182	7	142	84	2510.5	98	3.75
Briquettes	5	2603.5	2419.5	184	7	148	88	2507.5	96	3.7
Loose borings	5	2610	2450	156	6	180	62	2516	94	3.6
Briquettes	5	2610	2429	181	6.9	193	78	2507	103	3.9

No difference was noted in the physical properties of the alloy melted nor in the appearance of the castings upon inspection.

INVESTIGATION

EQUIPMENT

Our experiments were carried out with a briquetting press purchased from the General Briquetting Company, a manufacturer making such a press as a regular line of product. The press consisted of a hydraulic cylinder and end block which is connected by means of two side rods. It was provided with a 4-inch diameter mold, 9 inches in length; stroke of ram, 24 inches; diameter of hydraulic piston, 10½ inches; retrieve ram, 4-inch diameter; and a working pressure 3,000 pounds to 3,500 pounds per square inch.

TIME OF MELTING

The metal was melted in a Schwarz furnace, the average charge being about 540 pounds. In Test No. 1, we used 150 pounds of borings per heat, the remainder of charge consisting of scrap and prime metal. It took about 50 minutes to get the metal up to the proper pouring temperature and no difference in time of melting was noticed whether the borings were charged loose or in briquettes. In Test No. 2, we charged 225 pounds of borings per heat and in then took about 65 minutes to bring the metal up to the pouring temperature. Again there was no time saved by the use of briquettes.

MELTING LOSS

In order to determine the net melting loss, we weighed our pouring ladles—which hold about 100 pounds of metal—before having been filled with molten metal and after. The difference was added to the total pounds of metal poured from the heat. The skimmings and slag were run through our concentrating plant and the metal recovered. The melting loss, whether we charged loose borings or briquettes, was practically the same.

HANDLING OF BORINGS

If the convenience in carrying briquettes up to the furnace was the only item to be considered, the briquetting machine would now be in use in our foundry instead of on the scrap heap. Unfortunately this is not the case. After storage in our foundry for any considerable length of time the briquettes would develop cracks and distintegrate. After charging into the furnace, there was considerable breakage of briquettes. This was no doubt due to the air pockets in the briquettes expanding, the internal pressure thus set up disintegrating briquettes According to the manufacturers of the briquetting machine, this was not supposed to occur but even by following their instructions implicitly, we could not prevent the troubles.

PHYSICAL PROPERTIES

Considerable experimenting has been carried on in our foundry to determine the effect of charging various combinations of prime metal, scrap (gates, sprues, etc.) and chips. We have taken this matter up more in detail in another article.[2] We have found that any reasonable combinations of prime metal, scrap and chips can be used providing there are not too many detrimental impurities present such as sulphur, iron, etc., and that proper foundry conditions have been maintained. In our foundry we have been obtaining consistently good results by using any number of combinations. We aim to use up our scrap just as fast as it is received in the brass foundry and we make up our mixes accordingly. Briquetting the borings absolutely made no difference in the physical properties as compared to using loose borings as we maintained the proper furnace conditions while melting and poured at the proper temperature.

CONCLUSION

As above mentioned we are drawing no conclusions. We are merely stating the facts as we found them, hoping that they will be beneficial to the foundry profession in general.

*A paper read at the Cleveland Meeting of the American Foundrymen's Association, May 1, 1923.

[1] Technical Superintendent, The Ohio Brass Company.

[2] "Some Information on the Proper Melting and Pouring of Brass and Bronze." F. L. Wolf and Wm. Romanoff, A. F. A., 1923.

A List of Alloys

Reprinted from the Booklet Published by the American Society for Testing Materials. Part 3*

By WILLIAM CAMPBELL†

	COPPER Cu	ZINC Zn	TIN Sn	LEAD Pb	IRON Fe	OTHER ELEMENTS
Hamilton Metal	66.7	33.3	....	....	....	
Halberland Alloy	87.	13.	....	....	....	
Hardware Bronze	88.	12.	....	....	....	
Hardware Bronze	88.	9.50	1.50	1.00	....	
Harlington Bronze	55.7	42.7	0.97	....	0.58	
Harmonia Bronze	57.	40.	....	0.4	1.8	
Harmonia Bronze	55.7	41.2	0.5	0.46	1.29	Al, 0.86
Helmet Bronze	70.	30.	....	....	....	
Helmet Metal	72.27	27.58	....	....	....	
Hooker Brass	61.	37.	....	2.00	....	
Iserlohn, Cast	63.7	33.5	2.5	0.3	....	
Jewelers Metal	91.50	6.50	2.00	....	....	
Jewelers Metal	90.	10.	....	....	....	
Jewelers Metal	83.	17.	....	....	....	
Jewelers Metal	88.	11.25	0.75	....	....	
Jewelers Metal	87.50	12.	0.50	....	....	
Jewelers Metal	91.	7.50	1.50	....	....	
Kick Plate Brass	84.	15.	....	1.00	....	
Lancashire Brass	73.	25.	....	2.00	....	
Leaded Bronze	88.50	10.00	....	1.50	....	
Low Brass	80.00	20.00	....	....	....	
Machinery Brass	83.	16.	1.	....	....	
Mallet Alloy	25.4	74.6	....	....	....	
Manganese Brass	69.5	29.5	....	....	....	Mn, 1.0
Manganese Brass	60.15	34.76	0.94	0.39	1.19	Mn, 2.34; Al, 0.2
Manganese Brass	55.4	39.96	....	....	1.6	Mn, 3.20; Al, 0.2
Manganese Brass	55.0	39.5	....	....	0.7	Mn, 4.3; Al, 0.5
Manganese Brass	54.2	38.2	....	....	2.4	Mn, 4.4; Ni, 0.5
Manganese Brass	85.	2.0	....	....	1.83	Mn, 10.91
Manganese Brass	80.	5.	....	....	....	Mn, 15
Manganese Brass	75.5	8.	....	....	....	Mn, 16.5
Manganese Brass	60.	15.	....	....	....	Mn, 25
Mn Ni Brass	65.	5.	....	....	....	Mn, 20; Ni, 10
Mn Ni Brass	59.	20.	....	....	....	Mn, 3; Ni, 18
Mn Ni Brass	63.5	28.28	1.22	0.17	1.44	Mn, 3.24; Ni, 2.14
Mn Ni Brass	51.15	40.	....	....	2.25	Mn, 4.15; Ni, 2.2; Al, 0.25
Mn Ni Brass	53.5	39.	.07	....	2.78	Mn, 1.52; Ni, 2.35
Mn-Bronze, Rolled, Mn-r	59.	30.7	1.	....	....	Mn, 0.3
Mn-Bronze, Cast, Mn-c	58.	40.	....	....	....	Mn, 2
Manganin	53.4	39.	2.66	....	....	Ni, 2.5; Mn, 1.7; Al, 0.2
Manheim Gold	89.4	9.92	0.62	....	....	
Manheim Gold	83.7	9.3	7.	....	....	5 per cent of Phos. Tin
Manheim Gold	88.	12.	....	....	....	
Manheim Gold	80.	20.	....	....	....	
Market Brass	65.	35.	....	....	....	
Matrix Brass	62.	36.50	....	1.50	....	
Medal Metal	84.00	16.00	....	....	....	
Mosaic Gold	63.	35.	....	....	....	
Muntz Metal	60.	40.	....	....	....	
Naval Brass N-c	61.	38.	1.	....	....	
Neustadt, Drawn	71.5	28.5	....	....	....	
Nickel Brass	54.1	43.66	....	....	0.5	Ni, 1.5
Oker, Cast	71.9	24.4	....	1.1	2.32	
Oker Brass (Harz)	64.24	37.27	0.59	0.12	....	
Optical Bronze	89.00	6.50	4.50	....	....	
Oreide	87.25	11.50	1.25	....	....	
Oreide	90.	10.	....	....	....	
Oreide	85.5	14.5	....	....	....	
Oreide	80.5	14.5	4.85	0.1	....	
Oreide, Brunswick	68.21	31.52	0.48	....	....	
Parson's Mn Bronze	60.15	34.76	0.94	0.39	1.19	Mn, 2.34; Al, 0.23

*This booklet can be obtained from THE METAL INDUSTRY for $1. Parts 1 and 2 appeared in our issues of March and April, 1923.

†Professor of Metallurgy, School of Mines, Columbia University, New York.

	COPPER Cu	ZINC Zn	TIN Sn	LEAD Pb	IRON Fe	OTHER ELEMENTS
Pen Metal	85.00	13.00	2.00	....	....	
Percushion Cap	95.00	5.00	....	....	....	
Pewter (Thurston):						
Berthier's Alloy	71.9	24.9	1.2	2.0	....	
Cast and worked	64.2	34.6	0.2	2.0	....	
Cast and worked	61.6	35.3	0.6	2.5	....	
Cast gilt	63.7	33.5	2.5	0.3	....	
Cast gilt	64.5	32.4	0.2	2.9	....	
For clock work	60.66	36.88	1.35	0.74	....	
For clock work	60.06	31.46	1.43	0.88	....	
Pinchbeck	93.6	6.4	....	....	....	
Pinchbeck	88.8	11.2	....	....	....	
Pinchbeck	83.33	16.76	....	....	....	
Pin Wire	61.00	39.00	....	....	....	
Platine	43.	57.	....	....	....	
Potinjaune	71.9	24.9	1.2	2.0	....	
Primer Gilding	97.00	3.00	....	....	....	
Prince's Metal	83.	17.	....	....	....	
Prince's Metal	75.	25.	....	....	....	
Prince's Metal	60.8	39.2	....	....	....	
Reed Brass	69.00	30.00	1.00	....	....	
Rich Gold Metal	90.00	10.00	....	....	....	
Rich Low Brass	85.00	15.00	....	....	....	
Rule Brass	62.50	35.00	....	2.50	....	
Rubel Metal	55.	40.	....	....	....	5 per cent of Al-Fe-Mn-Ni Alloy
Rubel Metal	51.	40.	....	....	....	5 per cent of Al-Fe-Mn-Ni Alloy and 4 per cent of Ferro Mn
Russian, Cast	78.	21.	1.	....	....	
Russian, Cast	70.	30.	....	....	....	
Russian, Cast	66.6	33.4	....	....	....	
Screen Plates	58.00	41.00	0.75	0.25	....	
Screw Bronze	93.50	5.00	1.00	0.50	....	
Screw Brass	78.	16.	4.5	1.5	....	
Screw Wire	62.00	38.00	....	....	....	
Seamless Tubing	60.00	40.	....	....	....	
Seamless Tubing	61.50	38.50	....	....	....	
Solder, Hard	57.	43.	....	....	....	
Solder, Hard	50.	50.	....	....	....	
Solder, White	40.	60.	....	....	....	
Solder (Thurston):						
Yellow, Hard	53.30	43.10	1.30	0.30	....	
Nearly White, Soft	44.	49.90	3.30	1.20	....	
White, Very Soft	57.44	27.98	14.58	....	....	
Sheet:						
Stollberg	64.8	32.8	0.4	2.0	....	
Jamappes	64.6	33.7	0.2	1.4	....	
Rosthorn-Wiln	68.1	31.9	....	....	....	
Oker I	69.	29.5	....	0.97	....	
Oker	55.	44.5	0.5	....	....	
Iserlohn	70.1	29.9	....	....	....	
Romilly	70.1	29.26	0.17	0.28	....	
China	56.6	38.2	3.3	1.0	1.40	
Japan	66.6	33.4	....	....	....	
Hegermuhl	72.16	27.45	0.2	0.79	....	
Hegermuhl	72.	27.	1.	....	....	
Hegermuhl	62.	37.	0.5	0.5	....	
Hegermuhl	62.	37.	1.	....	....	
Shell Head Brass	75.00	25.00	....	....	....	
Shoe Nail Brass	63.00	37.00	....	....	....	
Shoe Tip Metal	88.00	12.00	....	....	....	
Similor	89.4	9.93	0.6	....	....	
Similor	83.7	9.3	7.0	....	....	
Similor	80.	20.	....	....	....	
Spring Brass	72.00	28.00	....	....	....	
Spring Brass	66.67	33.33	....	....	....	
Sterro Metal	60.	38.2	....	....	1.8	

This List will be continued in an early issue.—Ed.

White Metals

A Review of the Principal Classes of White Metals, Their Composition and Physical Properties, Chiefly in Relation to Their Uses and Manufacture.—Part 4*

By A. H. MUNDEY, C. C. BISSETT and J. CARTLAND

A good average alloy for monotype is tin 8 per cent, antimony 15 per cent, lead 77 per cent. The physical properties of this alloy are as follows:

Tons per Sq. In.		Brinell Hardness Number	Compression Test. Tensile Test	
Tons per Sq. In.	Elongation per Cent. on 2 In	10-mm. Ball, 500 kg.	Yield Point, 0.001 In.	Compressed to Half Length
5.07	0.7	29.9	3.212	13.516

These alloys vary, as some great printers require a higher grade of metal containing up to 10 per cent tin and 20 per cent antimony; to produce type of the highest class from this metal considerable skill and experience are necessary.

During the passage of the molten metal through the small nozzle or through the aperture of the valve, a momentary cooling below the critical temperature is liable to cause a deposition of tin-antimony alloy, thus partially closing the aperture and causing delay. The presence of small quantities of copper accentuates this feature and difficulty, as the formation of copper-tin crystals is still more liable to cause trouble.

It has been found that cast iron is more suitable than mild steel for the nozzles and valves, as tin-iron alloys are formed in the latter case, due to the prolonged contact of rich tin alloys with the iron at the temperature of working, causing rapid corrosion at the apertures.

The necessity for temperature control is evident. Even a draught of cold air from an open window upon the melting pot of the machine causes a cooling at the surface and a partial solidification and segregation of the tin-antimony compound. When this occurs, it is necessary to raise the temperature of the whole contents of the pot very considerably to effect a rapid re-solution of the separated constituent. Further rapid oxidation and formation of excess dross thus occurs.

The third group of printers' alloys are those called stereotype metals, in the application of which many metallurgical problems arise. It is necessary therefore to review the process very briefly in order to examine the nature of the difficulties.

When the page of type with any included zinc or copper plate illustrations or diagrams is ready from the compositor, it is locked up in a frame called a form, and is sometimes printed from direct, in the press, but more often stereotype plates are cast from it. A sheet of material similar to papier mâché, called flong, is pressed or beaten upon the type, etc., in the form. The plastic character of the flong enables a very true impression to be made in its face, and this is now dried and is placed in a suitable casting box, the papier mâché matrix forming the mold into which is cast the stereotype metal, thus making the stereotype plate. These plates are sometimes flat for flat-bed machine presses, sometimes in the form of a half-cylinder (the type face being the convex side) for use in the rotary presses, two of these half-cylinders being placed together after proper trimming, so as completely to cover one of the printing-machine cylinders.

The alloys used for stereotype work vary with the nature and importance of the service, the following being fairly representative:

	Tin	Antimony	Lead
(a)	10	15	75
(b)	9	19	72
(c)	8	15	77
(d)	5	15	80
(e)	3	15	82

	Tensile Test		Brinell Hardness Number	Compression Test. Tons per Sq. In.	
	Tons per Sq. In.	Elongation per Cent. on 2 In.	10-mm. Ball, 500 kg.	Yield Point, 0.001 In.	Compressed to Half Length
(a)	5.02	...	31.4	3.568	14.232
(b)	4.56	...	31.2	3.616	13.392
(c)	4.92	...	30.5	3.500	14.016
(d)	4.81	...	26.5	3.292	13.356
(e)	3.86	0.7	24.3	3.000	13.212

The stresses on the metal in use are twofold. First compressive, and secondly there is, in the rotary presses, the abrasive action wearing down the sharpness of the type face and thus making indistinct print, and also a slight bending stress on the type, causing distortion. The continuous application of these stresses in working can be imagined when it is remembered that in producing a great daily paper upward of 48,000 impressions are taken from one plate in one to two hours. A nickeled flat plate will give 250,000 impressions.

Casting temperature is very important, generally about 300°-330° C., although in some cases it is distinctly lower. In cases where the metal is cast under pressure from a pump, it is actually introduced into the mold in a condition not perfectly fluid, that is, crystals of tin-antimony alloy have separated out in a soft solid state. The metal must be as uniform as possible, and cooling must be reasonably rapid to prevent massive segregation or the plates are likely to be ruined. Water cooling is resorted to in more elaborate apparatus.

Fig. 7 (Plate II.) shows a portion of an illustration magnified 100 diameters, the dots being those produced by the photography through a half-tone screen 180 × 180 mesh to the inch.

Too high pouring temperature causes occlusion of gases, and consequent sponginess, or what the printer terms "cokey face." Irregular cooling or composition causes sinks, or local contraction, making white spaces on the printed matter.

Copper is sometimes used as an extra hardener; this is effected by the formation of the hard copper-tin and copper-antimony compounds. Much skill is required by the operators using copper-hardened alloys, as the tendency to separation in the melting and pouring, and the segregration of very hard constituents, is considerable.

The provision of metal for printers also includes the making of spacing material for insertion between type. The dimensions require to be most exact, a variation of 0.001 in. being the utmost allowable. It is found that in an alloy of 15 per cent antimony, 3 per cent tin, 82 per cent lead, this is quite possible, the contraction after casting in a highly finished steel mold being practically inappreciable.

The spacing between the lines is made by so-called "leads," which are cast in an alloy of slightly lower tin-antimony content. These are made, in some cases, by simple casting and machining, but in the more interesting process they are cast in the form of continuous ribbon about 0.75 in. wide by 0.1 in. thick. This is subsequently rolled with great accuracy to the required thickness. The rolling of these lead-base alloys temporarily softens them, but they are much tougher and more flexible than the cast

*Parts 1, 2 and 3 appeared in our issues of January, February and March, 1923.

strips. Aging gradually restores their hardness so far as can be shown by the Brinell test. Many experimental tests have been carried out with a view to getting more exact information on this feature. The great increase in toughness and flexibility of the rolled material compared with the cast strip gives the impression of softness. No difference in resistance to compression can be detected. An average of a number of Brinell tests gave before rolling 28.4 and immediately after rolling 27.5.

It will be recognized that the printing alloys are subjected in ordinary service to conditions to which no others are called upon to submit. They are cast, submitted to rapid and considerable mechanical stresses and then re-melted constantly, the whole cycle of operations being repeated daily for long periods, extending to months or years. The conditions of re-melting, frequently by persons of little skill, in many cases leave much to be desired; scraps of zinc, copper, brass, and nickel are apt to be accidentally introduced, whilst the constitution of the alloy is such as favors separation into two or more constituent compounds in the melting pot, the tin-antimony compound tending to come to the top on account of its lower specific gravity. Further, this lighter compound is more readily oxidized, forming dross which has to be removed by skimming, gradually impoverishing the alloy of its necessary constituents. To remedy this renewal alloys are employed which consist of carefully graded high antimony-tin alloys with lead, proportioned to the particular alloy to be brought up to specification. The addition of tin and antimony by this method is found to be much more convenient and effective than by the simple addition of these metals unalloyed. The elimination of impurities in these alloys is carried out by a very careful process of liquation poling, and drossing; these operations cannot as a rule be effected in the printing-offices, and the metal has to be brought to the refinery if it has become seriously contaminated.

Zinc is particularly troublesome in the metal, as it does not dissolve, and, further, it collects around it particles of tin-antimony compound, which it brings to the surface. It is sometimes removed by very extravagant drossing or by serious and wasteful overheating, steaming, poling, etc. These operations are expensive, slow, and not very effectual. In the authors' works the method employed is by the application of a mild thermit interaction, whereby the impurities are oxidized at the expense of appropriate metallic oxides, the formed oxide being dissolved by a flux immediately it is produced, and it is subsequently removed by careful skimming. The principle is quite simple, but experience and skill are required in carrying out the operation, as these reactions are reversible and small errors in temperature or manipulation are apt to restore the impurity to the bath of metal.

PEWTER

The manufacture of pewter has, it is feared, diminished greatly in recent years. Drinking vessels of the commoner sort are not usually made of pewter at present. Ornamental pewter is generally confined to old work or reproductions. It consists essentially of tin and lead, the latter never exceeding 20 per cent in good class work.

SOLDERS

Plumbers' solder of two parts lead and one part tin, with possibly 1 per cent of antimony, is the most interesting. This alloy has a long period of solidification; commencing to solidify at a temperature of about 60° above the final freezing point of the eutectic 180° C. The plumbers' wipe-joint is the most commonly known example of the usefulness in practice of a long distance between solidus and liquidus. It is usual to judge the quality of these alloys by the appearance of the surface, the plumbers' solder being generally expected to show bright spots. These features are not very reliable indications. Large users would be well advised to take the trouble to have analyses or solder occasionally.

In the case of tinmen's solder a long solidification is unnecessary and undesirable, the requirements being fusibility and fluidity. The ideal alloy for use as tinmen's solder is therefore the eutectic alloy containing 66½ per cent tin and 33½ per cent lead, but considerations of price have made the use of an alloy containing 50 per cent tin, or even less, general.

Britannia metals consist essentially of tin and antimony, hardened by small quantities of copper, with occasionally bismuth, zinc, etc. These have been recently exhaustively dealt with by F. C. Thompson and F. Orme,‡ and need no further notice in this paper.

‡Journal of the Institute of Metals, No. 2, 1919, vol. xxii, pp. 203-210.

This paper will be concluded in an early issue.—Ed.

Manufacturing Brass Pipe Fittings

Q.—A large manufacturer, whose name we cannot give as yet, believes he would like to even up production by making and selling brass pipe fittings. Just what sizes and varieties of fittings to produce, he does not know. He does know that he has a large foundry department to keep busy, and the equipment to make pipe fittings of all sizes.

1. Should he make fittings of small size, medium size, large size, or of all sizes?

2. Should he try to cover all users of pipe fittings, or concentrate on some large industry, such as refrigeration business, and standardize on sizes and kinds?

3. Is there a fair profit to be made today on fittings, or is it a beaten-down market, like the nail industry?

4. Do you think an independent would have a chance with Crane and the other large ones so well established?

5. How many different kinds of users of pipe fittings are there; that is, the principal ones?

6. What are the merchandising outlets for pipe fittings? Are there any outside of mill supply houses?

7. Is there something in the nature of a specialty in pipe fittings that would lend impetus to sales? (For instance, could they be put up in sets or assortments and sold through hardware store and implement dealers to consumers?)

8. What is the annual business done in pipe fittings in the limited states, and who gets the bulk of it?

A.—1. I would suggest a standard line of light square beaded fittings from ¼ inch up to 12 inches.

2. I think it would not be advisable to cover the whole field for a start but think a standard of fittings would be sufficient for a start.

3. There is a fair margin of profit on fittings when you are rigged up for production. As this is a special line of work, it requires special machinery designed for this work.

4. I think there is room for an independent concern with sufficient capital.

5. All factories, buildings and mills use fittings.

6. Plumbing supply houses hardware supply houses and mill supply houses are the jobbers that handle this trade.

7. I do not think you can handle the field of fittings other than through the supply houses.

8. Would suggest you get these figures from the Department of Commerce, Washington, D. C.

W. J. Rearson.

Re-Silvering Mirrors

A Description of the Methods, Solutions and Apparatus Used in Refinishing Old Mirrors*

Written for The Metal Industry by CHARLES H. PROCTOR, Plating-Chemical Editor

The silvering of plate glass to be used as mirrors is a commercial art in itself. To produce a product of the highest grade requires skill and experience, and men are trained especially for the purpose.

The mere act of pouring a chemical combination upon the glass which precipitates the silver as it comes in contact is not all there is to the silvering of the glass. The preparation of a chemically clean surface is one of the first principles to be followed for successful results. The next factor is the arrangement whereby the silvering mixture can be permanently held upon the glass during the silvering operation. The correct temperature (about 80 to 100° F.) must be maintained. Mechanical motion must be applied so that the solution is moved very gently to and fro during the silvering operation. Adjustable wooden frames lined with soft sheet rubber are used for silvering of the frames. The rubber does not need to cover the entire frame but only the bottom and possibly an inch up the sides and ends. The rubber can be tightened up when the frame is made so that it is practically water tight. Cypress wood makes the best frames. The wood, however, should be coated with an asphaltum paint both outside and inside, extending down to the rubber inside the frame. To give mechanical motion, rollers may be arranged so that a gentle to and fro motion results or a rocking frame may be made.

In refinishing mirrors, the silver should all be removed first. As nitric acid is the most efficient acid for dissolving of silver, a heated mixture of 1 part nitric acid and 1 to 2 parts of water applied to the heated glass will readily dissolve the silver.

The nitrate of silver held in suspension by reducing with the acid should be saved as the silver can be recovered. After removing the old silver coating, wash the glass thoroughly with clean cold water.

Before proceeding as outlined, the various solutions to be used in the silvering method should be previously prepared as follows:

Sensitizing Solution

Distilled Water	1 quart
Chloride of Tin Crystals	½ oz.

Silvering Solution No. 1. Stock Solution

Distilled Water	20 fluid ozs.
Pure Nitrate of Silver Crystals	3 ozs.
26% Aqua Ammonia	2 ozs.

To prepare the solution, dissolve the nitrate of silver in part of the water first at a temperature of 100° F. Then add the balance of the water, then the ammonia. A brown precipitate will result which will redissolve. The solution should be filtered by the aid of a glass funnel and chemically prepared filtering paper.

Silvering Solution No. 2. Reducing Solution

Distilled Water	5 ozs.
Tartaric Acid Crystals	1 oz.

Filter the solution as outlined above.

Silvering Solution No. 3
Used in Silvering Operations

Stock Solution No. 1	1½ fluid ozs.
Distilled Water	16 fluid ozs.
Reducing Solution No. 2	⅛ fluid oz.

Stir the solution thoroughly with a glass rod. Any proportions may be made upon the above basis. Keep each combination separately in dark colored bottles away from the daylight or sunlight, mixing them only as required for use. Some men claim the best results with the tartaric acid solution as given. Others prefer the Rochelle Salt solution so we give both types.

Rochelle Salt Silvering Solution
Solution A

Distilled Water	5 ozs.
Pure Nitrate of Silver Crystals	1 oz.

When the nitrate of silver is dissolved, add 26° aqua ammonia until the brownish precipitate formed is just redissolved. Now add more distilled water to make up a total of 100 fluid ounces.

Solution B

Distilled Water	20 ozs.
Grape Sugar	2 ozs.
Rochelle Salt	2 ozs.

When the materials are all dissolved, then add ½ oz. of pure nitrate of silver crystals previously dissolved in 2 ozs. warm distilled water. The solution should be boiled in a white enameled receptacle for about half an hour, replacing the water lost by evaporation. The solution should cool to normal temperature. It is advisable to filter the solution as previously outlined. When ready to perform the silvering operations, (but not before), mix solutions A and B.

After removing the old silver and washing with water, drain thoroughly, then flow over the glass a little of the sensitizing solution, drain thoroughly and repeat the water washing. Now flow over the glass the silvering solutions previously prepared from the tartaric acid or Rochelle salt combinations. The solution should remain upon the glass for about 20 minutes then remove the solution, which contains some silver and should be saved, and then gently wash with clean water.

The silvered surface should now be allowed to dry thoroughly and should be then backed up with an alcoholic shellac varnish which may be colored with metallic red or lamp black. The varnish should be flowed over the surface. Several of the lacquer manufacturers advertising in THE METAL INDUSTRY can furnish backing up enamels or varnishes for mirrors. The backing up completes the silvering operations.

In silvering new glass, the surface must be chemically clean. The use of mild alkali cleaners to remove any surface coating of a greasy nature is advisable. Such cleaners are advertised in THE METAL INDUSTRY. For metal cleansing, 4 to 8 ozs. of the respective cleaners dissolved in hot water will prove effective. Apply by sponges or flowing over the glass. Wash the glass afterwards thoroughly with water, then flow over the glass a mixture of 1 part nitric acid and 8 parts water.

Rewash thoroughly and then proceed with the silvering operations as outlined. Quite frequently new glass will show a cloud to reflected light. This cloud is claimed to be due to lead in the glass. Such a cloud can readily be removed from the glass by flowing a solution of hydrofluoric acid over the glass.

The hydrofluoric acid solution should consist of hydrofluoric acid 1 part, water 8 parts. The glass should be thoroughly washed following this operation.

*The METAL INDUSTRY has published a number of articles on this subject. The best known of these is probably Silvering Mirrors, by E. Blassett, December, 1913, page 523-4.

Silver Plating Cutters

An Answer to C. H. Proctor's Article on This Subject*

Written for The Metal Industry by F. C. MESLE

Mr. Proctor calls for a response from me notwithstanding we both stated in our last article that nothing more need be said; Mr. Proctor, not satisfied with the status of the discussion seeks to have it continued.

Rather than take up space in the smaller paper, "The Monthly Review," I submit the following to your paper, for which I trust you will find space. My plea for greater accuracy was first made because I felt that Mr. Proctor gave an impossible answer to a plating problem, i.e., "Plating knives with 24 amperes per dozen in a Silver Solution with 2 oz. of metal per gallon"—this would mean plating 14 dwt. knives in less than that many minutes. This solution was called "A Perfect Working Silver Solution."

In his reply to the above, Mr. Proctor explained that the problem in question involved the plating of knives previously tinned with a very thin coating of silver, and that the solution mentioned was not recommended for general plating, "in fact it was nothing more than a Silver Strike Solution." Platers do not generally use a 2 oz. silver solution as a strike solution when plating knives, but allowing that it may be practical to use the current recommended if only a strike deposit is desired, without producing burned deposit. A strike deposit usually requires only a few seconds in the bath. Allowing that this is a satisfactory explanation, we replied to the above, that our plea for greater accuracy was still needed because platers in general and factory managers and superintendents in particular, would not understand that "A perfect working Silver Solution" is nothing more than a "Silver Strike Solution," nor would they reconcile other terms used by Mr. Proctor in his first article that indicated a heavy deposit with a strike reposit.

Mr. Proctor evidently has realized the folly of such an explanation and again replies in the April METAL INDUSTRY, in which he asks for a response from me.

The last reply of Mr. Proctor tends to confuse the matter more, as it is not now clear for what purpose the solution in question is recommended—is it Strike or Plating Solution—in the first place it was "A perfect working silver solution," and second, "It was nothing more than a silver strike solution," now the inference is that it is a perfect working silver solution again, and the 24 amperes per dozen knives is not too much current to use. To justify this claim, reference is made to a paper I read at the 1917 A. E. S. Convention, in which I pointed out the possibilities of using a current density of 60 to 100 amperes and still do good work.

I am sorry if the paper referred to was used as the basis for Mr. Proctor's information when he gave 24 amperes per dozen knives as the correct current to be used in a solution with 2 oz. of silver per gallon. A casual reading of this paper will show that I gave a current density of 10 amperes for a solution containing 2 oz. of silver per gallon and that if the metal was increased to 4 oz. the current could be increased in proportion, therefore, to plate with a current density of 24 amperes, about 5 oz. of silver per gallon would be required, according to my 1917 paper. Why Mr. Proctor refers to this paper at all to justify his claim to 24 amperes per dozen, or square feet of cathode surface, I am at a loss to know, since it is clear that in that paper if I suggested anything I suggested a current density of 10 amperes for a solution with 2 oz. of silver per gallon.

If I was in error in pointing out the possibilities of plating silver at a current density of from 40 to 60, or even 100 amperes, by a combination of high metal content, plus agitation, plus temperature, plus carbonates, plus cyanide, brightener, etc., I would be pleased to have Mr. Proctor point out my error, and as I have opportunity I will experiment further in this direction and check up results with my previous work.

I assure Mr. Proctor that I have no objection to abstracts being taken from my 1917 paper that will prove the fallacy of any statement I made. I am interested only in facts and I would consider it a favor if Mr. Proctor will indicate wherein I am in error in anything I wrote in the 1917 paper. Surely a current density of 10 amperes for a 2 oz. solution is a long way from 24 amperes, as suggested by Mr. Proctor, and to which I have taken exception. If Mr. Proctor thinks 60 to 100 amperes are not possible by a combination of the factors mentioned above, and to save him time in looking too closely for errors in my 1917 paper, also for his information, will say that since writing the 1917 paper we have plated smooth deposits of silver at current densities much higher than any given in the 1917 paper—oh, no, not in a solution with 2 oz. of metal, nor with ordinary agitation and temperature, and yet I do not call this efficient plating practice.

Let it be clearly understood that the main point of difference is not that 24 amperes is too high a current density to use in silver plating with a proper combination of the other factors mentioned above, but that 24 amperes per dozen **is too high a current density** to be used in a solution with only 2 oz. of silver per gallon with ordinary agitation and temperature.

Let us assume that my 1917 paper is all wrong, even that would not make it possible to plate with 24 amperes per dozen knives in a 2 oz. solution of silver with ordinary agitation and temperature. I still think we need greater accuracy in handing out plating information.

*Previous statements in this discussion have been published in The Metal Industry for January and April, 1923, and The Monthly Review for November, 1922, and February, 1923.

Cementing and Brazing

Q.—Could you give us any information as to whether there is a formula whereby we can make a cement for bronze to have the effect as iron cement? Would also ask your advice for a composition of metal and a flux to braze or weld metal of this mixture — extruded bronze — 56½% copper; 40½% zinc; 2½% lead. Also a yellow brass 67% copper; 33% zinc.

A.—I presume you are desirous of producing a cement similar to Smooth-On cement for iron castings, which fills up porous parts. There is a cement for use on brass castings manufactured and sold by several foundry supply houses, advertising in THE METAL INDUSTRY for use on yellow brass. It can be used on castings that have developed porosity after machining, to fill up the porous parts.

I submit the following composition of brazing alloys.

Copper	Zinc	Lead	Tin	Characteristics	Color
58	48			Very strong	Reddish Yellow
53	47			Strong	Reddish Yellow
48	52			Medium	Reddish Yellow
54.5	43.5	0.5	1.5	Medium	Reddish Yellow
34	66			Easily fusible	White
44	50	2	4	Easily fusible	Gray
55	26	4	15	White Solder	White

For hard soldering or brazing a red heat is necessary and borax is the best flux to use as it protects the metal from oxidation and dissolves the oxides formed.—P. W. BLAIR.

Metal Finishers' Exposition

The First Exposition Ever Held Which Related Exclusively to Metal Finishes

The Metal Finishers' Exposition was held in Dayton, Ohio, April 9 to 14. It was conceived and managed by the Dayton Branch of the American Electro Platers' Society.

The Metal Finishers' Exposition represents the first organized effort to acquaint and educate the general public, who represents the ultimate consumer and who demand superior finishes, with the details and processes involved in producing these finishes.

In selecting and arranging the exhibits a logical plan was followed in order to present in an orderly manner the steps in handling products in the finishing process. Raw materials, equipment and processes were shown, and finally the application on the finished article. In many cases, working demonstrations were made. For instance, a paint manufacturer showed a grinding mill in operation, and the local branch of the A. E. S. had a complete plating plant in operation. A new process of photographically producing wood finishes on metal was shown in actual operation. Souvenirs were finished in the booths for distribution. A number of new products, equipment and materials were shown for the first time.

As a feature attraction popular lectures on various finishing subjects were being arranged. These were held in the afternoon and evening. Ladies' Day featured household appliances, and invitations were extended to the various Women's organizations in Dayton and surrounding cities. On School Day special features and demonstrations were given in order to teach the young the importance of finishes and what is involved in their production. Merchants' Day brought out the relation of finish to sales, educating them on the question of costs through a better understanding of the materials, equipment and labor involved in producing finishes.

The purpose of the exposition may be described as follows:

1st. To acquaint the buying public with the various methods and the many phases of the metal finishing business, necessary to produce the decorative and protective finishes which they consider so essential on all products.

2nd. To acquaint the manufacturer and dealer of these products with the many materials, processes and equipment necessary to produce finishes, and to demonstrate their application and use.

Every member of the branch, as well as the neighboring branches, is actively engaged in furthering the success of this project. Civic organizations are likewise assisting, and judging from the efforts put forth, the city of Dayton will add another new one to its already long list of original ideas. Following are names of the members of the Exposition Committee: M. G. Kopf, chairman; W. Fraine, secretary; H. J. Harter, J. I. Pace and A. Lamoureux.

Each exhibitor featured a process or product as indicated:

1. American Display Company, highly finished toys, Dayton, Ohio.
2. E. C. Conley Electric Company, highly finished household appliances, Dayton, Ohio.
3. Cline Optical Company, safety devices for metal finishers, Dayton, Ohio.
4. Ballard Sales Company, special finishes for automobiles, Dayton, Ohio.
5. Westinghouse Electric Products Company, finished electrical heating appliances, Mansfield, Ohio.
6. National Cash Register Company, method for wood finishes on metal, Dayton, Ohio.
7. Egyptian Lacquer Manufacturing Company, lacquer enamels, New York City.
8. Kay & Ess Paint Company, process for producing auto enamels and varnishes, Dayton, Ohio.
9. Computing and Recording Devices Company, lacquer enamels in practice and process for, New York City.
10. Jantz & Leist Electrical Company, electrical equipment for plating departments, Cincinnati, Ohio.
11. DeLaval Separator Company, paint, oils and varnish clarifiers, New York City.
12. Lasalco, Inc., rotary plating tanks and supplies, St. Louis, Mo.
13a. Hohman Plating Company, plumbing specialties and refinished work, Dayton, Ohio.
13b. Magnus Chemical Company, electric cleaners and cleaning materials, Brooklyn, N. Y.
14. Mitchell Engineering Company, direct connected ball-bearing polishing lathes, Springfield, Ohio.
15. Rieck Sheet Metal Company, ventilating systems, hoods, etc., Dayton, Ohio.
16. American Electro-platers' Society, operating plating room, samples of special finishes, Dayton, Ohio.
17. American Rolling Mill Company, pure iron manufacture and galvanizing, Middletown, Ohio.
18. Thos. Buchanan Company, plating supplies, Cincinnati, Ohio.
19. J. B. Ford Company, cleaning by agitation and cleaning materials, Detroit, Mich.
20a. Victor Manufacturing Company, plating barrels, Dayton, Ohio.
20b. Udylite Company, cadmium rust-proofing, Kokomo, Ind.
21. Coffield Motor Washer Company, electric washing machine tub finishes and tinning, Dayton, Ohio.
22. General Electric Company, electric ovens and sherodizing processes, Schenectady, N. Y.
23a. Rike-Kumler Company, selected art finishes, Dayton, Ohio.
23b. Dayton Museum of Art, hand-finished silverware, Dayton, Ohio.
24. Waukegan Chemical Company, color lacquers, Waukegan, Ill.
25. Hill & Griffith Company, polishing and buffing materials, Cincinnati, Ohio.
26. R. F. Johnston Paint Company, lacquer undercoats and anti-rust materials, Cincinnati, Ohio.
27. Roessler & Hasslacher Chemical Company, plating chemicals, New York City.
28. American Cities Service Corporation, outdoor finished specialty, Dayton, Ohio.
29. Dayton Plating & Manufacturing Company, job plating and auto bumper finish, Dayton, Ohio.
30a. U. S. Bureau of Standards, plating research publications, spray test device, Washington, D. C.
30b. Cincinnati University, paint and plating analysis and control, Cincinnati, Ohio.
31a. METAL INDUSTRY, Brass World, Paint Journal, trade publications.
31b. M. G. Kopf, Industrial Engineer, radium exhibit and educational literature, Dayton, Ohio.
32. Dayton Air Brush Company, spraying guns and booth, Dayton, Ohio.

As an attraction two lectures were given daily on popular finishing subjects and according to the following program:

MONDAY EVENING APRIL 9th

Opening Address, C. F. Kettering, vice-president, General Motors Corporation, Dayton, Ohio.

TUESDAY—INDUSTRIAL DAY

Raw Materials, moving pictures, D. M. Strickland, research engineer, American Rolling Mill Company, Middletown, Ohio.

WEDNESDAY—LADIES' DAY

Household Appliances, L. M. Williams, president, Utensils Company, Ft. Wayne, Ind.

Home Finishes and Art, Theo. Pond, director, Dayton Museum of Arts.

THURSDAY—FINISH DAY

Enameled Finishes, H. F. Kittredge, vice-president, Kay & Ess Company, Dayton, Ohio.

Plated Finishes, Dr. Wm. Blum, U. S. Bureau of Standards, Washington, D. C.

Metallurgy of Nickel, moving pictures, International Nickel Company, New York City.

FRIDAY—DEALERS' DAY

The Plating Industry, C. H. Proctor, plating specialist, New York City.

Finish and Sales, C. E. Steffney, sales manager, National Cash Register Company, Dayton, Ohio.

SATURDAY APRIL 14th BANQUET

Cadmium Rust-proofing, W. E. Louth, Udylite Company, Kokomo, Ind.

Address of Welcome to A. E. S. visiting members, M. G. Kopf, director of exposition.

Response, W. J. Allen, national president, A. E. S., Grand Rapids, Mich.

It will interest members of the American Electro Platers' Society to learn that there is an active movement among Art Directors throughout the country more closely to unite the beauties of finishes with design in the production of commercial products. Theodore Pond, Director of the Dayton Museum of Arts, and a practical worker in metals, has commended the Director and the Committee for the ideals of the Exposition.

Through the efforts of Mr. Pond a competition was conducted to design a poster for publicity and to be symbolical of Metal Finishing. A prize was awarded by the Exposition for the poster shown. This poster has been favorably commented upon by advertising experts and will receive due recognition in their circles.

The Metal Finishers' Exposition As I Saw It

Written for The Metal Industry by CHARLES H. PROCTOR,

Plating-Chemical Editor

In Dayton, Ohio, during the week of April 9th to the 14th, was held The Metal Finishers' Exposition, the first of its kind in the world. It was the result of the labor of about thirty men, members of the Dayton Branch of the American Electro-Platers' Society, who banded together as a unit and decided to follow the late Theodore Roosevelt's advice by doing something for the up-building of their profession.

The exposition was a revelation to those who were privileged to attend it. Any man could see its far-reaching possibilities. It could develop a market in the middle west, which would cover every line of metal goods used in our domestic life, and the building of our homes.

There are perhaps a thousand articles used inside the home in the production or finish of which the electroplater and metal finisher has, in one way or another, some part. From an outside standpoint it was first thought that this exposition was purely a local affair, but from what I saw and the discussions I had with many of the visitors it was national in its character and will, no doubt, next year prove more completely so. Some of the best firms in their respective lines in the United States took part in the exposition, showing their wares and explaining in detail their various uses and applications. Professional as well as practical men were visitors and some of our greatest industries sent their representatives to Dayton for the entire week to watch its progress. I talked with these men and all joined in saying it was a great success.

Exhibit places have already been taken for next year's exposition and it is believed that the entire Memorial Building will be used to its capacity. Dayton is a splendid city for such an exposition, situated as it is in the Miami Valley, in the middle west manufacturing district.

The Metal Finishers' Exposition for 1923 has come and gone, and a great future lies before it. To Kopf, Fraine, Lamoreux, Harter and Pace, who through their untiring efforts and zeal brought this exposition to such a successful termination, all praise should be given. But all the members of Dayton Branch of American Electro-Platers' Society deserve mention because they, in no small measure, have borne the weight of the affair, not for financial gain, but for the honor of the American Electro-Platers' Society and their profession. May their work continue.

METAL FINISHERS' EXPOSITION, DAYTON, OHIO

THE METAL INDUSTRY

With Which Are Incorporated

THE ALUMINUM WORLD, COPPER and BRASS, THE BRASS FOUNDER and FINISHER, THE ELECTRO-PLATERS' REVIEW

Published Monthly—Member of Audit Bureau of Circulation

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Entered February 10, 1903, at New York, N. Y., as second class matter under Act of Congress March 3, 1879

SUBSCRIPTION PRICE, United States and Canada $1.00 Per Year. Other Countries $2.00 Per Year :: SINGLE COPIES, 10 CENTS
Please Remit by Check or Money Order; Cash Should Be Registered

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ADDRESS ALL CORRESPONDENCE TO
THE METAL INDUSTRY, 99 JOHN STREET, NEW YORK
Telephone Number Beekman 0404. Cable Address, Metalustry

Vol. 21 New York, May, 1923 No. 5

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EDITORIAL

FOUNDRYMEN'S CONVENTION

It was the feeling of those who attended the convention, just held in Cleveland, that it ranked with the best. The exhibits were plentiful and attractive in appearance, and the visitors were numerous.

Important papers read at the Technical sessions made it one of the outstanding gatherings. The exchange paper submitted by the Association Technique de Fonderie on the progress of Alpax in France was received with great interest. The paper suffered from an inadequate translation and from the fact also that the author or translator was less familiar with American practice than with French, but it was of great value nevertheless, since this alloy seems destined to make a deep impression in the aluminum casting field.

Of prime importance was the report of the joint committee on Molding Sand Research. This committee, headed by Major Bull has been financed largely by subscriptions from industrial concerns. Much more money is needed ($15,000 in round numbers) and it is doubtful if any money could be better spent by the foundry industry. Later it was announced that a total of $20,000 had been contributed by F. S. McFadden, John A. Penton, the late S. E. Seaman, V. E. Minich and H. S. Simpson to carry on research and suitably recognize individual effort. The organizations co-operating in this research are American Foundrymen's Association, American Society for Testing Materials, National Research Council, Bureau of Standards, Bureau of Mines, Geological Survey and the Canadian Department of Mines. The committees' report was a thorough explanation of the methods developed for testing sands for three qualities, (1) bond or cohesiveness (2) permeability (3) fineness. The methods devised seemed to meet with the approval of the audience to whom this report was read and bid fair to become standard practice in all foundries which use enough sand to institute testing methods, and also testing laboratories. Abstracts of this report and other papers presented at the convention will be found elsewhere in this issue.

Interesting papers and practical papers were presented by F. L. Wolf and W. Romanoff. Their work on plant operation is extremely important. It seems to be decidedly practical work carried on in a scientifically sound manner.

It is well known that the Papers Committee is operating under difficulties of various sorts. Its troubles could be greatly decreased, however, if the members followed the advice of Dr. Merica at the get-together-dinner of the Institute of Metals. The real need of the Institute is for more papers.

A gratifying occurrence was the election of G. H. Clamer to the presidency of the American Foundrymen's Association. It is our impression that he is the first to hold that office who was not engaged in the iron or steel industry. Speaking for ourselves and for metal men generally we offer him warmest congratulations.

THE METAL FINISHERS' EXPOSITION

The exposition held in Dayton, Ohio, the week of April 9th marks a most important departure in the metal finishing industry in the United States. For the first time an exposition has been held devoted to finishing only. The importance of this fact to platers and finishers cannot be over-estimated.

Reports from the Dayton newspapers and from visitors at the exposition are unanimous in their judgment that the exposition was a complete success, not only as a method of educating both the public and the manufacturers, but also from a financial standpoint. It is reported that the exhibitors have received excellent returns, both in the quality of the prospects located and in the actual orders placed. Plans are now under way for the second exposition which will be held, also in Dayton, some time in March, 1924. To this, the charter exhibitors have pledged their support. Some have taken increased space, and with the additional reservations the exposition will be at least twice as large as the one just held. There will be more working demonstrations and a wider range of products.

It is gratifying to see metal finishing, an art as old as industry itself, coming into its own. A thousand years ago all such work was done by hand. To-day the machine plays a large part but it is still an art, and its products can be made just as beautiful as they ever were.

The question has arisen about the consolidation of this exposition with the annual convention of the American Electro-Platers' Society. If this is possible and satisfactory to all concerned, there is no inherent reason why it should not be done, but whether or not the exposition is held together with the annual convention is of secondary importance. The thing which really matters is that it should continue to be held.

SAFETY CODES FOR FORGING

The American Engineering Standards Committee held a meeting recently to begin work on drawing up safety codes for the forging industry and for plate and sheet metal working. Although this applies largely to the steel industries, nevertheless a good deal can be done for non-ferrous metals, as is evidenced by the presence of representatives of the Copper and Brass Research Committee, National Council of Lighting Fixture Manufacturers, Electrical Manufacturers Council and the United States Bureau of Standards.

It was pointed out that the machines used caused 23 per cent. of all the accidents in forging plants. Most of the trouble occurred at the point of operation — 58 per cent. under this heading, flying objects caused 21 per cent and moving parts other than belts and pulleys caused 19 per cent. of the accidents. Hammers caused 41 per cent. of the accidents.

Other figures were shown for the sheet metal industry. There is already a code for punch presses but from this

code hot stamping has been purposely excluded. It was felt that forging and hot stamping should be embodied in a special code. A resolution especially worthy of note was that "a safety code for the forging industry be developed to include drop forging and other hammer forging. . . but not to include cold extrusion of non-ferrous metals or hydraulic presses. . . ."

It was also voted that the work be done under the auspices of the American Engineering Standards Committee. It was thought best to put off the making of a safety code for plate and sheet metal working at the present time to avoid interference with the prompt development of the proposed forging code. It was also voted that a national safety code for gas and electric cutting welding processes was greatly needed.

Work along these lines and codes on the industries pointed out should be of great importance to brass and aluminum manufacturers since forging has taken an increasingly important place in these fields.

OBSOLESCENCE

An item in cost keeping which has always puzzled the manufacturer is that of obsolescence. When is it advisable to write off a machine, or for that matter a product, as obsolete, and to replace it with a new one?

The Chamber of Commerce of the United States, through a bulletin just issued by its Fabricated Production Department, calls obsolescence "one of our industrial problems dealt with mostly in a haphazard way, or by rule-of-thumb practices because its cost burden has not been fully realized." Taking up this question from the point of view of the products manufactured, they point out that it applies mainly to such machines as will call for the later purchase of spare parts. In this case the desire of the manufacturer is to retain the good will of the public by offering them the privilege of buying replacements "at any time." This statement has turned out to be very expensive.

Just where the line should be drawn in this matter is difficult to state. The interests of the manufacturer and consumer should both be considered. The recommendations of the Chamber of Commerce, however, are interesting and should be given thought. They are as follows:

"A system should be established in each industry to deal with obsolescence in lines produced and the equipment used in manufacturing them.

"As a general rule the persons most competent to deal with the dropping of the lines are (a) General Manager, (b) Sales Manager, (c) Superintendent or Production Manager.

"In discontinuing lines the points to be weighed most carefully are: The protection of the consumer in providing for duplication of complete units and constituent or repair parts based on a reasonable estimate of the life of an article after being put in use; second, in justice to the producer the duration of such service should be considered from the standpoint of the burden or expense of maintaining it.

"From an accounting standpoint, the treatment of obsolescence pertaining to patterns, molds, dies, jigs, etc., we find is not being dealt with independent of general depreciation. Consequently the rates warranted are not developed. It would seem, however, in the heavier lines a special study would be justified to determine more accurately the actual depreciation loss."

The lines specifically mentioned in the bulletin are: machine tools, stoves, china ware, bicycles, cash registers, engines, pumps, clocks, electric motors, heavy machinery, tools, silverware, farm implements, filing cabinets, small tools and boilers.

SKILLED HELP IN THE FOUNDRY

At the Convention of the American Foundrymen's Association in Cleveland, April 28-May 3, there were read two sets of papers, on "Training Foundry Workers" and "Apprenticeship in the Foundry," which should be of interest to everyone concerned with the foundry industry. Various plans for training were discussed, some of the courses of which have been tried out and, it was stated, are in successful operation. Everyone is fully aware of the fact that as business improves, and it is improving, there will be an increased need for trained workers. The question is not about the demand but about the best method of supplying that demand.

It was stated that local foundry groups could secure state co-operation in training boys in industrial schools through the local school superintendents. Apprenticeship courses have been organized which should give the workers a broader understanding of their trade than is common to the typical specialty molder. It is a mistake to think that the development of molding machines has made it unnecessary for molders to be really skilled. This error has aggravated matters by placing good journeyman molders in the position of having to work for less money than unskilled men operating molding machines on piece rates. This situation should be righted wherever it exists.

It is a known fact that it is not easy to get boys to learn the foundry trade. The work is hard, dirty and the pay is not commensurate, at least, in the average brass foundry, with the difficulties of the trade. There are easier, cleaner trades which pay more. Conditions are undoubtedly changing to such an extent that will force the foundry industry to recognize the fact that it must offer inducements either in rates of pay or stability of employment in order to attract new men.

ARBITRATION VS. LITIGATION

A very interesting movement is now on foot in New York, sponsored by some of the most prominent business and legal talent in that city, to substitute arbitration for litigation in business matters.

Uniform endorsement was given, by an assembly of more than 300 people at a meeting for this purpose, to the movement inaugurated by the Arbitration Society of America to educate the public in general, to make use of arbitration in the settlement of disputes and controversies where questions of mere fact are concerned. It seems that the movement has been brought about by the loss of time and the congestion of the court calendars in New York. For example, six years ago there were 10,000 cases on the calendars of the Supreme Court of the First Department of New York City, and early in the present year this number had amounted to 27,000.

In a business which offers so many opportunities for disagreements, disputes and litigation as the metal trades, a movement of this sort is particularly interesting. There is no reason why two business men who disagree should not sit down together and settle the thing simply and to the best interests of both, at the same time avoiding the payment of a large part of the sum involved for legal expenses. The interest of these trades in this movement is shown by the presence at the meeting of such men as E. D. Conley, president of the Conley Tinfoil Company; Jordan L. Mott, Frank C. Overton, president of the National Association of Waste Material Dealers, Inc.; Ludwig Vogelstein, president of the American Metal Company; Max Lissberger of B. Lissberger and Company; S. S. Tuthill, secretary of the American Zinc Institute.

New Books

The Journal of the Institute of Metals, Volume XXVIII. Edited by G. Shaw Scott, Secretary. Published by the Institute of Metals, 36 Victoria street, London, S. W. 1, England. Size 5½x8½, 1,010 pages.

This is the regular semi-annual publication of the British Institute, containing the papers read and the discussions which followed at the September, 1922, meeting. It also includes, as usual, abstracts of papers relating to non-ferrous metals and the industries connected therewith. The papers have all been published in abstract in THE METAL INDUSTRY, but this volume also includes a complete record of the discussions.

Tales from the Gangway, by Pat Dwyer. Published by the Penton Publishing Company, Cleveland, Ohio. Size 6" x 9", 450 pages with frontispiece and over 200 illustrations. Price payable in advance $3.00. For sale by THE METAL INDUSTRY.

This is a compilation of articles which have appeared in The Foundry over a period of several years. They are cheerful, readable and humorous, and contain a great deal of information about iron foundries. The language used is informal and so far as possible, non-technical. The book should be useful not only to students but to those with extended experience in the foundry profession. The work is not a hand-book but deals only with prominent and outstanding features and unusual "kinks" of the iron foundry.

Home Instruction for Sheet Metal Workers. By William Neubecker. Edited by Frank X. Morio. Published by the U. P. C. Book Company, N. Y. Size 6" x 9". Over 684 illustrations with 15 folding plates bound separately. Price payable in advance $5.00. For sale by THE METAL INDUSTRY.

This is a practical instruction manual for the apprentice, mechanic and master sheet metal worker, covering the course of instruction given to the students in the sheet metal department at the New York Trade School.

It includes detailed instructions on cutting, forming, soldering, preparing full-size details from architects' blue prints, developing the patterns, laying out the work on sheet metal, forming and bending on the brake and setting the work together.

Glue & Gelatin, by Dr. Jerome Alexander. Published by the Chemical Catalogue Company, 19 E. 24th Street, New York. Size 6x9, 236 pages. Price, payable in advance, $3.00. For sale by THE METAL INDUSTRY.

This is A. P. S. monograph number 11. The author is an authority on colloid chemistry and has had wide experience with the subject covered in this book.

He discusses the glue very thoroughly from the theoretical and scientific standpoint before taking up practical applications. There is a chapter on Chemical Examination which would be of value to any metal manufacturing plant using glue, and another on the testing and grading of glue and gelatin. A survey of uses and also of the test methods of the National Association of Glue and Gelatin Manufacturers is included.

Nickel, by F. B. Howard White. Published by Isaac Pitman & Sons, 2 West 45th Street, New York. Size 5x7, 118 pages. Price, payable in advance, $1.00. For sale by THE METAL INDUSTRY.

This is one of the Pitman series on common commodities and industries. It covers the subject of nickel from mining to industrial applications, including history, occurrence in nature, smelting, refining, manufacture of malleable nickel, nickel alloys, nickel coinage and nickel plating. There are also chapters on nickel in steel and oil hardening in nickel.

The book is necessarily small and therefore does not pretend to be exhaustive, but it contains much useful information, some of which is rather difficult to find elsewhere. It is illustrated and contains numerous tables which are of value. Along with its companion publication, it makes very handy additions to the technical library.

American Society for Testing Materials. Index to volumes XIII-XX. Size 6x9, 189 pages. Price, payable in advance, $2.50, in cloth binding and $3.50 in half leather binding. For sale by THE METAL INDUSTRY.

This index covers the contents of the above volumes including preface and lists of key-words. The A. S. T. M. has become one of the most important organizations in the non-ferrous field, and no good technical library is complete without its proceedings. The index, of course, makes the finding of any definite point a very simple matter.

CORRECTION

In our April issue we noted the price of the Annual Proceedings of the A. S. T. M. as $6.00 or $6.50. This was an error. The price is $6.00 or $6.50 per volume, and since there are two volumes, the total cost is $12 or $13, depending on the binding chosen.

The New Metal Worker Pattern Book, by Geo. W. Kittredge. Published by U. P. C. Book Company, New York. Size 8½x10¾, 514 pages. Price, payable in advance, $6.00. For sale by THE METAL INDUSTRY.

This book is a complete course of instruction in the modern methods of developing and cutting patterns for sheet metal work. The principles underlying practically every problem that is likely to come up in practice are explained. The book explains the selection of drawing instruments and takes the apprentice through linear and geometrical drawing.

It is intended for a reference work and encyclopedia on its subject. All of the problems are classified according to three forms or methods used in their developments, that is, the parallel line, conical, flaring or radial line and modern system of triangulation. It is from this basis that the reader is explained the methods of cutting patterns. The work is exclusive and is completely illustrated throughout. It is detailed and is obviously meant for the practical man.

Aluminum and Its Alloys, by C. Grard, translated by C. M. Phillips. Published by Constable & Company, Ltd., London, England. Size 5½ x 8½, 184 pages. Price $5.00, payable in advance. For sale by THE METAL INDUSTRY.

This is a discussion of the variation of the properties of aluminum and its alloys when subjected to varying degrees of cold work, varying heat treatment and methods of quenching. The properties of aluminum and of its alloys, their thermal treatment and their industrial applications are thoroughly covered.

The book is divided into two main divisions. Book 1 covers production and properties of aluminum, while book 2 covers the alloys, their properties and industrial applications. Much valuable data is included and it is safe to say that the book is probably as near to being a complete compilation of information about aluminum as exists. The book is written for the testing and designing engineer and metallurgist. However, it is also an excellent reference work for the practical man either in the foundry or in the manufacturing plant.

Automobile Pattern Drafting, by Frank X. Morio. Published by the U. P. C. Book Company, Inc., New York. Size 6" x 9", 64 pages including 10 detailed blue prints 15" x 18". Price payable in advance $3.00. For sale by THE METAL INDUSTRY.

A concise course of instruction in laying out complete patterns for hoods, cowls, bodies, guards, fenders and other sheet metal parts with chapters on stamping, painting and finishing. In addition there are ten detailed blue prints 15 x 18 inches wide, and also many useful tables.

Contents by chapters. 1—Modern Automobile Construction. 2—Painting and Finishing. 3—Instructions in Laying Out. 4—Plate 1, Front Mud Guard. 5—Plate 2, Parallel Line Cowl. 6—Plate 3, Body Patterns. 7—Plate 4, Pattern for Visor or Nose for Mud Guard. 8—Plate 5, Pattern for Automobile Hood. 9—Plate 6, Automobile Cowl. 10—Plate 7, Auto Seat for Sport Body. 11—Plate 8, Combination Measure and Funnel. 12—Plate 9, Square Funnel with Offset. 13—Plate 10, Skirt for Automobile Mud Guard. 14—Useful Tables and Methods.

1922 Year Book published by the National Association of Cost Accountants.

No phase of business to-day is receiving more attention than the costs of production and the way in which cost data may be used in the determination of business policy. The importance of these

questions is evidenced in the great attention given to them by the business and trade periodicals. More than 150 articles dealing with costs appear each month in the trade journals and business magazines of this country.

The National Association of Cost Accountants, 130 West 42nd Street, New York, with its 3,000 members in this country, Canada and in foreign countries acts as a clearing house for the collection and dissemination of cost information and in a large way is spreading the gospel of business control through accurate cost data. It has just issued its 1922 Year Book of 452 pages which contains a complete report of the proceedings of the Third International Cost Conference held at Atlantic City, N. J., Sepember 23, 25, 26, 27, 28, 1922. The book is replete with practical information of great value to cost men, managers, industrial engineers, and public accountants. The material in the Year Book was presented by the leading cost accountants in the country and deals with some of the most important cost and managerial problems confronting business men.

Correspondence and Discussion

ANNUAL METAL FINISHERS' EXPOSITION

To the Editor of THE METAL INDUSTRY:

The writer has discussed the possible future of the Metal Finishers' Exhibition with Mr. Procter. The exhibitors have expressed themselves as in favor of holding an annual affair of this kind.

The writer is of the opinion that an exposition of this kind, broadened out so as to include the abrasive manufacturers, the makers of buff and polishing wheels, and everything connected with the plating industry, the makers of varnishes, japans, etc., pertaining to the metal industry could be handled successfully in two ways: first, to hold it in one of the mid-west cities, preferably Dayton, its birthplace, in view of its central location, or second, to have the American Electro Platers' Society take it over as an annual affair in connection with the annual convention.

If the American Electro Platers' Society would adopt the idea and stage it after the manner of the American Foundrymens' Association, it would, in the writer's opinion, do more to build up the Society in the eyes of the manufacturer and to gain his support than anything else the society could do.

WALTER FRAINE.

Dayton, Ohio, April 17, 1923.

DROSSY SOLDER

To the Editor of THE METAL INDUSTRY:

Reading over the shop problems of your February issue, I noted the question on Coating Iron and Brass Castings. The trouble of the solder drossing is due to metallic zinc, absorbed by the metal from the brass castings. Sometimes fine particles of iron are absorbed by the tin in the solder bath. I have noted this to happen when the metal got too hot and the flux got dry. It is best to build a new flux when it dries up.

I hope this information may be of use to you.

JOSEPH ECKERT, JR.

New York, Apirl 15, 1923.

Technical Publications

THE PREPARATION OF FUSED ZIRCONIUM

By HUGH S. COOGER*

In the course of certain alloy investigations, a considerable quantity of zirconium was needed to pursue the work. This metal is a rather scarce commodity, and therefore its preparation in the laboratory became necessary. Although nothing novel is claimed for the process described herein, yet there are a number of interesting features and essential precautions involved in the production of the metal, which are considered of sufficient importance to be published in some detail. The experimental data on the establishment of the melting point of zirconium metal are also given, as well as a brief description of some new alloys.

After due consideration of the various methods employed in the past for making zirconium, it was decided to adopt the method in which zirconium tetrachloride is reduced by sodium, because this seemed to be the most promising. Previous experience in producing anhydrous chlorides also influenced this decision to some extent. Although some zirconium chloride was made by passing chlorine over the oxide in the presence of carbon, the yields were rather unsatisfactory. By far the major portion of the work was carried out by the action of chlorine upon zirconium carbide, a procedure which gave satisfactory results.

The carbide chlorination scheme has been used heretofore by Moissan and Lengfeld, and also by Wedekind, but a brief description of the apparatus used in the laboratory, as well as the results obtained, will be given because of some rather important considerations involving the purity and physical character of the chloride, the latter greatly influencing the yield of zirconium metal during reduction.

INVESTIGATIONS ON PLATINUM METALS AT THE BUREAU OF STANDARDS

By EDWARD WICHERS and LOUIS JORDAN*

The Bureau of Standards has undertaken a comprehensive investigation of the platinum metals, involving the purification of all metals of the platinum group, critical studies of analytical separation of the platinum metals, the melting and mechanical working of the pure metals and their alloys, the study of selected alloys with respect to their suitability for platinum ware, and the determination of a variety of physical properties of such metals and alloys. The first three phases of this investigation are actively in progress; the last two phases are to be undertaken in the immediate future.

*A paper read at the Forty-third General Meeting of the American Electrochemical Society, in New York City, May 3-5, 1923.

THE INFLUENCE OF THE BASE METAL ON THE STRUCTURE OF ELECTRODEPOSITS

By W. BLUM and H. S. RAWDON*

It is shown that if copper is deposited electrolytically upon cast or rolled copper which has been cleaned with alkali, the structure of the base metal does not apparently affect that of the electrodeposit. If, however, the surface of the base metal has also been treated with nitric acid, the electrodeposited copper possesses both the crystal form and orientation of the base metal.

METHODS OF HANDLING MATERIALS IN THE ELECTRIC FURNACE AND THE BEST TYPE OF FURNACE TO USE

By FRANK W. BROOKE.*

The author discusses, in general, the design of various electric furnaces, such as the plain box type, the special box type, the car type, the recuperative and continuous furnaces, and refers to their advantages and disadvantages. Attention is drawn to the method of handling materials for these furnaces, so that a uniform temperature and high furnace efficiency may be maintained.

THE EFFECT OF IRON ON THE ELECTRODEPOSITION OF NICKEL

By M. R. THOMPSON.*

A number of previous investigations are reviewed, and it is concluded that the results may have been influenced by lack of regulation of the hydrogen ion concentration or pH. It is shown that, if the pH is properly controlled, the presence of iron in nickel solutions does not necessarily cause cracking or peeling of the deposits, as it has often been supposed to do. Deposited iron has a primary effect upon the crystalline structure of nickel deposits, rendering the latter finer-grained and therefore probably harder, although more brittle. Occluded basic precipitates containing iron may injure a deposit by making it porous, or dark in color.

SHOP PROBLEMS

IN THIS DEPARTMENT WE ANSWER QUESTIONS RELATING TO SHOP PRACTICE

ASSOCIATE EDITORS { JESSE L. JONES, Metallurgical; WILLIAM J. REARDON, Foundry; PETER W. BLAIR, Mechanical; LOUIS J. KROM, Rolling Mill; CHARLES H. PROCTOR, Plating-Chemical; R. E. SEARCH, Exchange-Research

ALUMINUM CASTING

Q.—We are at times called upon to furnish plates, some in various sizes ranging from 12″ to 24″ square all the way from ¾″ to 1¼″ thick in aluminum. We frequently cast these in 98 per cent aluminum, 2 per cent magnesium, but invariably have some porous holes. We have also tried making them in the ordinary No. 12 mixture, but prefer the former mixture for reasons of strength, etc. These plates are used in the rubber industry and it is necessary that they be practically free from any porosity or fine pin holes. We might add that we have no pyrometer and in making the magnesium mixture we have tried making a hardner first, but have obtained a very little better degree of success than with the other way of melting.

A.—In reference to porous holes in aluminum, would say that this trouble can be caused from a number of sources. Overheating causes the most trouble, also the manner of melting. When good casting is desired free from porosity, we recommend the old style crucible furnace. While the iron pot is most commonly used in this country, we are still of the opinion that it is a very crude method to say the least. We much prefer the open flame furnace using gas as a fuel and for first class work we favor the black lead crucible for melting aluminum. Magnesium alloys with aluminum very readily and is really a deoxidizing agent. Aluminum sometimes absorbs gases from the furnace such as carbon monoxide (CO) and this gas is given off in cooling, which results in blow holes and porous castings. The addition of magnesium not only acts as a deoxidizing agent when applied to pure aluminum or copper-aluminum alloys by absorbing the gases, but results in better, stronger and more dense castings.

We suggest a mixture of 2 copper, 2 magnesium and 96 aluminum. Melt 94 parts aluminum, add 4 parts of a mixture of 50 copper, 50 aluminum, stir well and add 2 pounds of stick magnesium. Take one fourth pound stick magnesium held in a pair of iron tongs and push it gently to the bottom of the crucible. Be sure the magnesium is melted before the tongs are drawn. Stir slowly and repeat until 2 per cent magnesium is added. If you melt and handle your metal this way you should have very little trouble with porous holes in plate casting.—W. J. R. Problem 3,192.

ALUMINUM IN BRASS

Q.—We use lake copper and virgin spelter. Our metal seems to be too spongy. The mixture we use is 40 spelter and 60 copper. We have about fifty pounds of metal in a crucible, and add some alluminum in order to have this metal run freely. Would it be possible for us to use too much of this, and could you advise us how much alluminum we should use to fifty pounds of metal, and what to use in order to get a close grain. Our trouble lies in the castings, when they are finished they spot, especially the brush brass finish. We also use coke in our furnaces. Should we use hard coal, or would that not make any difference?

A.—In adding aluminum to a brass mixture, the smallest amount that will deoxidize the metal and free the zinc oxide, is all that is advisable. We suggest you use a mixture of 58½ copper, 41 zinc and ½ aluminum for your work. Introduce the aluminum in the form of 10 per cent aluminum bronze by melting 90 pounds copper and adding 10 pounds aluminum, stir well, and pour in small ingots so as to be able to make weight; and make your mixture 54 copper, 41 zinc and 5 10 per cent aluminum bronze. It is important in making this mixture that you melt the copper first using charcoal as a flux and get the copper good and hot, about 2,150 degrees Fahr., then add the zinc a little at a time. Stir after adding each portion of zinc. When the zinc is all added then add the aluminum bronze and just before pouring add a spoonful of salt. Stir and pour in the regular way and you should obtain the results you desire. It is immaterial whether you use coke or coal for a fuel. Coke is considered the best fuel for fast work.—W. J. R. Problem 3,193.

BLACK NICKEL

Q.—What shall I use in a black nickel solution to avoid a smut? My solution contains cyanide, white arsenic, nickel salt, water of ammonia and carbonate of ammonia.

A.—It is possible that an addition of sodium cyanide to your black nickel solution will overcome the smutty deposit. The use of sodium cyanide in the formula as outlined puts the solution in the cyanide class. Try half ounce per gallon of sodium cyanide first and increase in small quantities until the deposit is brighter.

The following formula if used at 120-140° F. will give you the best results providing the current is controlled as with any other type of solution:

Water	1 gallon
Double Nickel Salts	8 ozs.
Ammonium or Sodium Sulphycyanide	2 to 4 ozs.

Use nickel anodes.—C. H. P. Problem 3,194.

COVERING CUT NICKEL

Q.—We are nickel plating about 8,000 brass spoons per day. We find about 500 that are cut through. We would like to know if you could send us a formula for touching up the brassy spots. We have been using a sponge and electricity but the method is too slow.

A.—It is not so easy to cover up nickel spots upon brass that have been cut through in buffing. The surface in the first instance is greasy and nickel does not deposit as a rule by simple immersion.

The method you have used is the one commonly used—that of sponging the spots by the aid of the current and a piece of nickel anode, the sponge constantly moistened with the nickel solution. We will, however, suggest a method that might give the results you want. You can try it out.

Place in an aluminum kettle some nickel solution and heat it at 160° Fah., add to the solution about 1 to 2 ozs. bicarbonate of soda—smaller amount of solution, the soda in proportion. Cleanse the nickel parts that have "cut through" and wash them as usual and then put them in the aluminum kettle and stir around rapidly for a moment or two with a wooden stick. The brass spots should cover over with a film of nickel. If this method fails then it is advisable to make up a basket from wire netting of sufficient size so that one hundred or more of the defective parts can be plated or rather colored at one time.

Take 1 part of your nickel solution and 1 part hot water and add ¼ oz. muriatic acid per gallon of solution and water. Fix up as you would for plating in the regular manner. With a small anode use a strong current and the articles should cover over with nickel in a moment in the hot nickel solution. The solution can be returned to the regular solution when you are through with it. It would only require a few minutes to color up 500 pieces if they are small. You could repeat the method as required.—C. H. P. Problem 3,195.

HOT NICKEL

Q.—How is a hot nickel solution made up?

A.—The only difference in the composition of a hot nickel solution over a cold nickel solution is that of an increased density primarily from the metal basis.

Hot nickel solutions give the best results at around 160° F. Some platers use higher temperatures—180° F.

It is advisable to agitate hot nickel solutions by compressed air or use a continuous filtering method, such as the Belke Continuous Filter to keep the solution in agitation and remove insoluble particles of carbon, etc., that become reduced from the anodes more readily in a hot solution than a cold still solution.

The advantages of hot nickel solutions are that ordinary nickel deposits resulting from a cold solution can be obtained in one

third the time in a hot nickel solution. Naturally three times as much amperage is used to get these results.

FORMULA FOR HOT NICKEL SOLUTION

Water	1 gallon
Single Nickel Salts	1½ lbs.
Nickel Chloride	2 ozs.
Boracic Acid	4 ozs.
Sal Ammonaic	6 ozs.
Cadmium Sulphate	2 grains

Forty to 50 amperes should be readily obtained per square foot of surface area with this type of solution at 4 to 5 volts.

A very small amount of free hydrochloric acid is an advantage, from ⅛ to ¼ oz. will be found ample.—C. H. P. Problem 3,196.

LYNITE

Q.—We would be thankful to receive your recommendations relative to the compositions and method of handling of Lynite alloy in sand casting with a view to obtain a casting of maximum tensile strength.

A.—There are a number of mixtures of aluminum called lynite. This is no more nor less than a trade name. The mixture most commonly used is one similar to an alloy known as No. 12 alloy, which consists of 92 aluminum and 8 copper, while lynite consists of a mixture of 91.50 aluminum, 7.50 copper and 1 iron. This mixture is known as No. 112 and has average tensile strength of 20,000 pounds per square inch, elongation 1½ per cent, Brinell hardness 55 and specific gravity, 2.85, and is generally used in all kinds of automobile parts such as crank cases, gear housing, oil pans, bearing caps, etc. This alloy is used by most foundries and has been the most satisfactory alloy of the aluminum mixtures to handle in foundry practice. There is some doubt as to the iron being necessary in the alloy. There are other lynite mixtures that give higher tensile strength, but are somewhat harder to handle in foundry practice, as heat treatment is sometimes used to assist in obtaining maximum tensile strength. If you are looking for an aluminum alloy that will give the maximum tensile strength we would recommend the following:

½ of 1% Chromium Copper
10% Chromium
4% Copper
Balance Aluminum

This mixture will give you as high as 30,000 tensile strength, and work very successfully in sand casting, and is handled as follows: Make a hardener of 50 copper and 50 aluminum, pour in ingots, melt 8 pounds hardener and add ½-pound 10 per cent chromium, stir well and add 92 per cent aluminum, stir and flux with cryolite and pour at approximately 1,250 degrees Fahr. The lynite mixture and No. 12 is handled by just making a hardener of copper and aluminum by melting the copper in a crucible, and if you care to use the iron add the iron to the mixture. Melt 37½ pounds copper, 5½ pounds iron and add 57 pounds aluminum. Stir well and pour into ingots and use as follows: Melt 80 aluminum and add 20 hardener. If no iron is desired, melt 50 copper and add 50 aluminum, pour into ingots and use as follows: Melt 84 aluminum and add 16 of the hardener.—W. J. R. Problem 3,197.

MOLDS FOR CASTING PLASTER

Q.—Will you kindly give us a formula to make glue or gelatine mold for casting plaster paris, also the formula of a dip or spray for metalizing plaster casts before copper plating.

A.—The plaster objects should be thoroughly dry, usually they are dried in a kiln at about 100° Fah. After drying, the casts are immersed in molten parafin wax to which is added 1 oz. carumbia wax to each pound as a hardener. When the casts so treated are hard and dry, then they are coated with two thin coats of orange shellac diluted with denatured alcohol. When the shellac coating is dry and hard then two thin coats of platers' copper bronze powder should be applied by spraying. The bronze powder is mixed to a fluid state with copper bronze lacquer medium. Both the copper bronze and the lacquer medium can be purchased from well known lacquer firms advertising in THE METAL INDUSTRY.—C. H. P. Problem 3,198.

NICKEL ON CUTLERY

Q.—We are installing a 200 gallon nickel solution. This we will use for plating only high grade cut'ery for carving sets, such as the knife, fork with the guard, and the sharpening steel.

We have been nickel plating these articles in our regular solution in which we do all kinds of job work but have had too much blister and peeling.

This cutlery come to us in a highly polished lime finish, the forks having sharp points and the knives a sharp cutting edge. They are oiled to prevent rusting in transit. Our customer requires a heavy nickel plate, color buffed, and a first class job.

In fitting the guards on the forks they tell us some of them have to be bent and twisted which results in peeling at that point. Also, they hone the knives after plating which lifts the nickel on the edge.

Kindly give us your formula for a nickel solution and the cleaning methods that will overcome these difficulties.

A.—For your requirements we realize that you require a perfectly adherent ductile nickel deposit, so we suggest the following formula:

Water	1 gallon
Double Nickel Salts	8 ozs.
Single Nickel Salts	2 ozs.
Boracic Acid Crystals	3 ozs.
Sal Ammoniac	1½ ozs.
Pure Hydrochloric Acid	¼ oz.

Voltage 3 to 4. Temp. 80° Fah.

The upkeep should be made from a concentrated nickel stock solution, using the following proportions as a base:

Water	as required
Single Nickel Salts	1 lb.
Boracic Acid	2 ozs.
Sal Ammoniac	1 oz.

—C. H. P. Problem 3,199.

RUST-PROOF NICKEL

Q.—How can I produce a rust-proof nickel?

A.—A rust-proof nickel-plated surface cannot be absolutely guaranteed, but for commercial nickel-plated steel products a zinc-nickel deposit will give a rust-proof deposit that will answer all purposes desired, covering atmospheric exposure, etc.

The method of producing such a rust-proof nickel deposit should be as follows:

1st. The steel parts should be plated in alkaline solution of sodium and zinc cyanide, with proportions as follows:

Water	1 gallon
Sodium Cyanide	5 ozs.
Zinc Cyanide, 98%	6 ozs.
Caustic Soda, 76%	4 ozs.
Soda Ash, 58%	2 ozs.
Corn Syrup	¼ oz.

Temperature of solution 120° F. at 5 volts. Anodes should be 60% pure zinc and 40% Duriron or nickel to control the solution. The solution deposits zinc rapidly and bright. After zinc plating the surface should be color-buffed, recleansed and nickel-plated with the following solution at 90 to 100 F.

Water	1 gallon
Double Nickel Salts	8 ozs.
Common Salt	3 ozs.
Sodium Citrate	3 ozs.
Sal Ammoniac	½ oz.
Epsom Salts	½ oz.
Citric Acid	⅛ oz.

The voltage for the nickel solution should be five. During nickel-plating the solution should be agitated slightly so as to allow a strong current to be used without burning.

A twenty-minute nickel deposit with a fifteen-minute zinc deposit as outlined will give the best rust-proof nickel deposit that it is possible to get and will fulfil commercial requirements.—C. H. P. Problem 3 200.

PATENTS

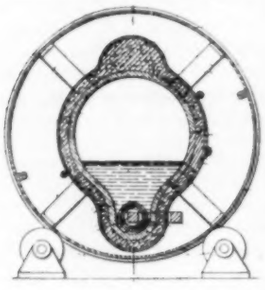
A REVIEW OF CURRENT PATENTS OF INTEREST

1,444,345. February 6, 1923. **Transfer Metallic Deposit.** Paul R. Heygel, Morsemere, N. J., assignor to Peerless Roll Leaf Company, Inc., a corporation of New York.

This invention relates to transfer metallic deposits, particularly in roll form.

An object of the invention is to produce a transfer deposit of metallic powder of suitable composition and releasable at elevated temperatures as by means of a heated die operated under pressure in a die press, tipping machine or other transfer effecting device. Such transfer metallic deposit is secured to a strip of paper or like inert material serving as the vehicle for the deposit mass and enabling the deposit material to be wound in rolls, for the convenience of shipment and convenience of use in the die press or other transferring machine.

1,444,584. February 6, 1923. **Electric Furnace Having Resistor Dome.** G. H. Clamer, Atlantic City and J. R. Wyatt, Camden, N. J., assignors to Ajax Metal Company, Philadelphia, Pa.



This invention relates to furnaces of a type which are capable of rotation or oscillation in use and of tilting transversely to the axis for pouring, if desired, and utilizes both the reflected and radiated heat from the upper furnace walls upon the surface of the metal and subsequent direct contact of the pool with these "upper" walls as the furnace is rotated or oscillated.

The purpose of the invention is to provide for generation of the heat within the furnace wall over the charge by reason of the resistance offered by said wall to the passage of electric current therethrough.

1,444,828. February 13, 1923. **Pressure-Casting Apparatus.** Silvio Brusa, Milan, Italy.

The present invention relates to a new or improved means for running off metals into a mold or into a shell. According to the invention the metal is not run off by tilting the crucible or melting pot, but by removing the liquid metal from the crucible to the mold or to the shell, by means of gas, oil, or other fluid under pressure.

1,444,870. February 13, 1923. **Manufacture of Adhesive Metallic Powder in the Form of Metallic Scales.** Yotaro Fujita, Kyoto, Japan.

This invention relates to the manufacture of adhesive metallic powder in the form of metallic scales to be used for applying, in scattered manner, to the surface of cloth or paper in order to make any required design thereon.

1,444,946. February 13, 1923. **Soldering Flux.** A. L. Brown, Wilkinsburg, Pa., assignor to Westinghouse Electric & Manufacturing Company.

This invention relates to soldering fluxes and it has, for its primary object, the provision of a soldering flux or paste which shall be non-corrosive in its action and consequently, suitable for use even in the most delicate electrical work.

1,445,253. February 13, 1923. **Resistance Alloy.** John H. White, Cranford, N. J., assignor to Western Electric Company, Inc., New York.

This invention relates to resistance materials and has for its object an improved metallic alloy having a specific resistance many times that of copper, capable of withstanding high temperatures without deleterious oxidation and sufficiently ductile and otherwise workable to permit its formation into a filament or other forms suitable for use in the resistance elements for electric heating appliances and the like.

1,445,385. February 13, 1923. **Centrifugal Casting** Machine. Leon Cammen, Tuckahoe, N. Y.

The present invention refers to a new construction of centrifugal casting machines, in which means are provided for rapid insertion and removal of molds, and for supporting the mold in such a manner as to make it find its own center position with respect to the axis of rotation, and to reduce the bursting stresses thereon.

1,445,557. February 13, 1923. **Polishing Composition.** James Rigney, Anniston, Ala., assignor of one-half to J. I. Dodd, Birmingham, Ala.

This invention relates to an improved polishing compound for surfaces of wood or metal which is adapted for freshening or refinishing surfaces which have previously been varnished or coated with other finishing material, and is particularly adapted for use in refinishing automobile bodies.

This composition consists of the following ingredients combined in substantially the proportions stated, viz.:

High grade spar varnish.....	½	pint.
High grade floor varnish.....	1	pint.
Japan drier	½	pint.
Synthetic oil of wintergreen.....	1	oz.
Gasoline.....a little less than	3	quarts.

1,445,860. February 20, 1923. **Apparatus for Treating Metals.** Joseph S. Turek, Cicero, Ill.

This invention provides a furnace which is sectional, that is, is composed of a bottom, top and a removable intermediate portion, so that whenever the lining of said intermediate portion need be renewed or replaced, it may be removed from the furnace as an entirety and repaired and replaced, or else an auxiliary replacement part may be substituted therefor.

1,446,332. February 20, 1923. **Alloy and Method of Making Same.** J. W. Bramwell, Berwyn, Pa., assignor to American Bronze Corporation, Berwyn, Pa.

One object of this invention is to provide a high grade bearing bronze in rod or tubular form, for use particularly in automatic screw machines for the economical production of bushings of various sizes and lengths, or in sheet form for the economical production by stamping of discs and washers.

1,446,678. February 27, 1923. **Method of Making Castings of Composite Metals.** Charles T. Wilks, Clinton, Mo.

This invention relates to improvements in method of making castings of composite metal.

The object of this invention, therefore, is the production of a method for forming composite castings from bronze and iron, semi-steel or steel integrally united.

1,446,998. February 27, 1923. **Metal Cleaning and Polishing Device.** John A. Vincent, Springfield, Ill.

This invention relates to metal cleaning and polishing devices of the kind that are composed of an abrasive fibrous substance and a cleaning agent combined in the form of a pad or article that is intended to be rubbed over metal which it is desired to clean or clean and polish.

1,447,111. February 27, 1923. **Melting Pot Particularly for Stereotyping Metal.** Carl Winkler, of Berne, Switzerland.

A melting furnace for stereotype metal, comprising two melting pots each having a valve controlled outlet, two adjoining furnaces, one wall of each of which forms a wall of a pot, flues for the furnaces, and a valve for establishing communication between the said flues.

1,447,143. February 27, 1923. **Manufacture of Lead Alloys.** Walter Mathesius, Charlottenburg, Germany.

This invention relates to the manufacture of alloys of lead with more than one or with three alkaline earth metals, calcium, barium and strontium in specified proportions.

EQUIPMENT

NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST

BLAST EQUIPMENT

The handling of metallic abrasives by air suction for the separation of the abrasive from molding sand, core sand and other impurities, and its return for re-use to the sandblast machine, is a novel feature which The W. W. Sly Manufacturing Company, 4,700 Train Avenue, Cleveland, Ohio, demonstrated by an operating exhibit at the Foundrymen's show.

The ever increasing use of metallic abrasives, such as chilled iron shot and crushed grit, for sandblast purposes, is perhaps due to the lasting qualities of these materials, more than to any other reason. With proper precautions to prevent scattering of such abrasives, they will last almost indefinitely and retain their abrasive qualities, provided all foreign matter with which they are mixed during the blasting operation are constantly and thoroughly separated and removed.

An additional advantage claimed for the metallic abrasives over sand, especially in sandblast rooms and cabinets, is the elimination of dust created by the disintegration of the sand.

Sandblast equipment is used very extensively for cleaning of castings, and with this operation, the molding sand and core sand removed from the castings becomes mixed with the spent abrasive.

If this mixture were returned to the sandblast machine, the effectiveness of the abrasive would be impaired and the ejection of the sand and dust through the sandblast nozzle would create a dust condition which the use of metallic abrasives was to eliminate. It is therefore necessary to effect a thorough separation of the abrasive from all impurities. Such a separation is extremely difficult to accomplish by mechanical screening, as such a method would only screen by size, and would not permit the separation of sand grains from the abrasive.

The Sly Company has, therefore, designed a pneumatic separator which, it is stated, effectively accomplishes a thorough separation of metallic abrasives from other materials. A patent has recently been issued to cover the design and application of this separator. It is applied to, and made part of, the ventilating system of their sandblast equipment.

The expansion of the air current and an ingenious arrangement of two baffles in this separator permit the metallic abrasive to drop and be discharged, while sand and dust and other lighter materials, irrespective of size, are carried on by the air current. A restricted abrasive discharge opening on this separator permits the entry of a small volume of air which gives the abrasive a final washing effect.

The air required for ventilation, therefore, is put to two additional tasks: that of lifting the abrasive for return to the sandblast machine, and of thoroughly cleaning and separating it from the refuse.

This pneumatic system of elevation and separation is extremely simple. No mechanically moving part whatever is required. There are no bearings, no gears, pulleys, belts, screens, etc., to require constant attention for lubrication, maintenance and repairs.

A working model of this system was shown at the Foundrymen's Convention in the booth of the W. W. Sly Manufacturing Company.

SAFETY DEVICES FOR HANDLING CHEMICALS

A line of safety devices is being marketed by Scholes, Inc., 186 Lafayette street, New York. The devices are for use in handling acids in carboys, and are of three types: (1) The one-man carboy truck; (2) the two-man carrier and dumper; (3) the folding safety carboy dumper.

The one-man safety carboy truck is designed for quick and safe handling of carboys around yard and factory. Ruggedly constructed, with special wheels and 2-in. tires; built low, and well balanced for quick work over any surfaces. The prongs are pushed under cleats with the foot against axle, and instantly grip and lock the carboy (of any size) until the spring is raised. It is said to be especially convenient and economical over grades.

The two-man carrier and dumper is for combined carrying and complete dumping operations. The carboy (of any size) is instantly gripped and locked between bars and is only released when the springs are raised. It has 2 iron ells which hook over cleats when bars are under them.

The folding safety carboy dumper is all iron and designed for use with the one-man safety carboy truck in laboratories, plating rooms, pickling rooms, dyeshops, etc. It is said to enable accurate and safe pourings, and complete emptying (required by new regulations concerning carboys returned). Has locking device with which carboy is instantly locked in place and can only be instantly released when spring-dogs are raised from ratchets. Bottom safeguards against loose or rotted bottom boards. Can be folded and placed in small space when not in use. With this dumper and the one-man carboy truck there is no need to touch the carboy from the time it is taken from pile until it is returned empty. Another advantage claimed is that these devices hold the carboy even if it should be broken.

ONE MAN CARBOY TRUCK

TWO MAN CARRIER AND DUMPER

CARBOY DUMPER FOLDING SAFETY

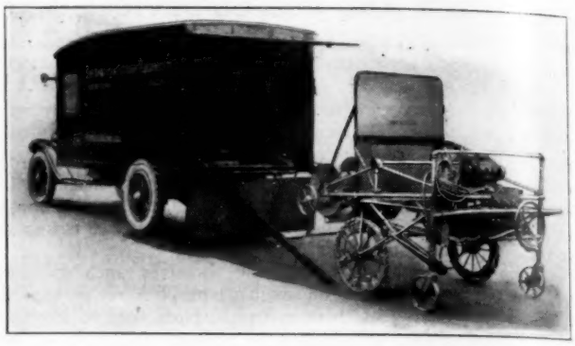
SAND CUTTING MACHINE

A unique method of educating foundrymen to the advantages of the sand cutting machine has been adopted by The American Foundry Equipment Company, 366 Madison Avenue, New York.

A specially built commercial body on a Dodge chassis is used to transport a standard size sand cutter about the country from foundry to foundry where it is to be demonstrated. The sand cutting machine is "dropped" off at the foundry door, the power cable plugged in on the electric circuit, and the machine is ready to trundle to a sand pile and pitch in. There is no guessing, nothing assumed, nothing taken for granted, about this method of selling. Skeptics have their doubts disproved or confirmed on the spot.

A number of blades, mounted in cylindrical form, revolve rapidly and as the sand cutting machine moves slowly forward astride the sand heap these blades blend the sand and disintegrate all lumps. The machine travels under its own power with the operator only guiding it.

This demonstrating car has been traveling in the Middle West for several months. There is no cost to the foundryman for the service, and no obligation.



SAND CUTTING DEMONSTRATOR

The schedule for an extended trip this spring is now being prepared and demonstrations desired should be arranged well ahead of time.

NEW DeVILBISS PLANT

Ground has been broken for the construction of a new plant unit for The DeVilbiss Manufacturing Company, Toledo, Ohio, makers of the widely used DeVilbiss Spray-painting System, which will call for an expenditure of $1,000,000, including equipment.

This new unit of fireproof brick and concrete construction with four stories, will be 580 feet long by 80 feet deep and will face on Phillips Avenue, southeast of present buildings, and lie between Detroit Avenue and Lagrange Street. The structure is the first of two similar buildings to be constructed on the Company's 55-acre factory plot to afford more adequate plant room and improved production facilities for the rapid and substantial expansion of the business. The completion of this first unit will also enable the DeVilbiss concern to effect a more efficient grouping and consolidation of the several manufacturing divisions of the business, now located at this point and in other parts of the city.

Among other special appointments, rest rooms and a cafeteria will be provided in the new building. While tennis courts, baseball diamonds and other recreational features will be maintained on a more elaborate scale in the park-like setting the city factory site presents.

The DeVilbiss Company expects to occupy the new building within six months.

DE VILBISS MANUFACTURING COMPANY, TOLEDO, OHIO

TAPPING MACHINES

All manufacturers of small parts invariably have some parts that have to be tapped. Of course, the days of tapping by hand where there are more than a dozen holes of a kind to be tapped, have gone by.

The expense of a tapping machine or a tapping attachment for a drill press has become so moderate and their use so universal, that it is impossible for manufacturers of articles even in very small quantities which they have to tap, to get along without a tapping machine of some kind.

One of the first of these machines was the No. 4, designed by the Saint Louis Machine Tool Company, St. Louis, Mo., for the Twin Burner Stove Company in 1897. The construction of this machine at the present time is still very much the same as the first designed. There have been a few improvements, but it is claimed to have been such a satisfactory machine and such a rapid tapper that there has not been very much change. The other machines were natural developments to meet the requirements of the trade.

The second machine was sold to a small brass foundry that took a contract for making some street car brass trimmings. They tapped 130,000 holes with this in the first couple of months that they had it.

The work is brought up to the tap by the foot treadle, leaving both hands free to handle and hold the work. As the platen stem works in a long sleeve, the work comes up to the tap true, insuring true holes and avoiding breakage of taps.

The machines are furnished with or without tap holder. When tap holder is furnished, price includes fitting. Tap holders are either plain or friction.

SOLDERING TORCH

The Jewelers' Technical Advice Company, 22 Albany street, New York, has recently purchased the patents, special tools, and stock on hand, of the Jacques Kreisler Patent Soldering Torch,

for use in jewelry and dental work and all kinds of small soldering work. They will in the future manufacture this torch in addition to the regular Hoke O. K. line of oxy-gas torches.

On the 19th of the month the U. S. Patent Office granted patents on the Hoke-Phoenix Platinum Melting Torch.

The torch uses oxygen and ordinary gas; will work with compressed air and gas, and, if it ever becomes necessary, you can use it as a mouth blow pipe. The pilot light can be adjusted to suit. Automatic shut-off closes instantly when through using—or the knurled adjuster can be screwed down to give a constant flame when a constant flame is wanted. It is light in weight—only 4 ounces.

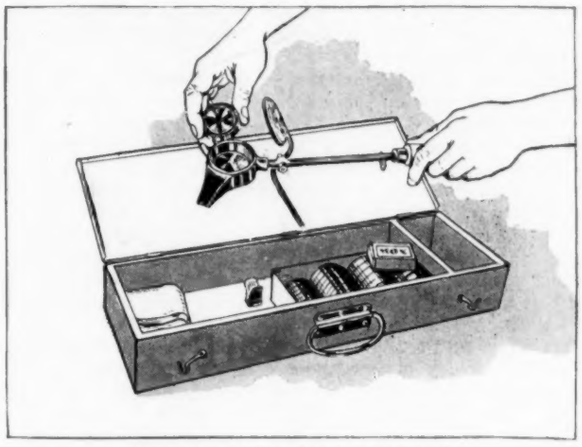
Special Features—automatic trigger control of the oxygen supply. Constant flame control; easy, quick acting gas control; pilot light does not readily blow out. Can be adjusted to large or small pilot. Corrugated hose connections—cement your hose onto torch—seldom needs wiring or clamping.

Mixing of the gases—with this torch, as illustrated, the oxygen and gas mix at the end of the outer tip, thus, it is claimed, rendering back-fires impossible.

NEW SOLDERING IRON

A soldering iron which, it is claimed, employs no heat from an outside source, but utilizes a chemical reaction, has been brought to this country by the International Sales Company, 921 Southern Building, Washington, D. C. It is stated that a comparatively recent invention produces, by chemical transformation, a degree of heat of approximately 3,000° C. in a few seconds. They can, it is claimed, with an exactly measured quantity of a reactionary mixture, heat a soldering iron, or a sad iron, in seven seconds to a point where it is ready for immediate use.

This soldering iron has a receptacle cast into it. In this is placed a small tin container holding the required mixture. The head of a special match is inserted through an opening in this container, or briquet, and the wooden portion broken off. A perforated lid is then closed over the receptacle and the protruding match-end lighted. Instantly an intense white glow appears through the holes in the lid and the iron is ready for use. The heat from this one application lasts about ten minutes, after which another charge can be immediately lighted and the operation continued. After the first heating, the duration of heat under one charge is increased fifty per cent. The International Sales Company recommends this iron for all soldering purposes.



INTERNATIONAL SOLDERING IRON

BRANFORD BAG HOLDER

The Malleable Iron Fittings Company of Branford, Conn., has put out a bag holder for use in foundry and factory shipping rooms. It is intended to take the place of the helper in the shipping and sorting room. It is stated that the bag holder saves its cost in one week when the helper is eliminated.

BRANFORD BAG HOLDER

The bag is made of semi-steel and steel tubing. The regular height is 30 inches, but can be varied to suit customers' needs. The bag is held open by five renewable pins, and by reversing the bottom for the top, a range of from 16″ to 24″ width of bags is obtained.

THE OLD RUST PROBLEM

New processes are being constantly developed to prevent steel rusting and doubtless there is need for several different processes to meet the various conditions encountered in the metal industry.

Galvanizing has its place, of course, but there are certain disadvantages in the use of this process, mainly, the fact that the dimensions of the part are altered.

The Parker rust-proof process came into great popularity during the war, being used on many kinds of Navy material, including mines. The Parker Process, it is claimed, has the advantage that it does not alter the dimensions of the steel part at all; also, that a delicate spring may be Parkerized without effecting the tension.

One of the unusual features of Parkerizing, it has been stated, is that it can be successfully applied to castings which are intricate in shape and in which the recesses are deep, because, wherever the liquid bath comes in contact with the metal, it completely Parkerizes the surfaces.

The Parker Process does not place a deposit on the surface of the metal; it actually changes the composition of the metal surface.

The finish is another important point. Not only is the Parkerized surface perfectly smooth, but it is a finish in itself—or, if baked enamel is used, the claim is that the Parkerized surface affords an ideal paint basis. The Pyrene Manufacturing Company at Newark, New Jersey, states that it has been very successful in using this finish on its fire extinguisher brackets: so successful, in fact, that it has now enlarged its plant in order to handle work for other manufacturers.

ASSOCIATIONS and SOCIETIES

REPORTS OF THE CURRENT PROCEEDINGS OF THE VARIOUS ORGANIZATIONS

AMERICAN ELECTRO-PLATERS' SOCIETY

ANNUAL CONVENTION

Headquarters, care of G. J. Tyndall, 52 Union Street, Attleboro, Mass.

The annual convention of the American Electro-Platers' Society will be held at the Providence-Biltmore Hotel July 2nd to 5th, inclusive.

Monday morning will be utilized for registration and the afternoon will be devoted to papers. The first speaker will be Dr. Fink of Columbia University.

Tuesday will be devoted entirely to pleasure. The delegates will leave Providence at 9:20 in the morning to go to Newport, where they will have a shore dinner and water sports. This is going to be some dinner.

The water sports are intended to take the place of the historic baseball game between the East and the West. While the East has been trimmed in the baseball game many times, it is rumored that the West is due for a licking this year. The plans were to go to Newport on Wednesday, but due to the crowded condition on the shore due to the holiday, it was decided to go Tuesday instead. The entire day will be devoted to food and fun.

Wednesday will be a regular session day, going through the regular business and discussion of technical papers and practical plating problems. It is the intention of the committee to have the best available technical men to address these meetings as well as well-informed practical platers.

Thursday will be devoted to the inspection of factories and they have already obtained permission from the Gorham Manufacturing Company to go through their entire plant and showroom. There will also be other plants to be inspected. There will be a business session in the afternoon at which time the officers will be elected and the meeting will be adjourned to the banquet hall when the officers will be installed.

There will be an excellent banquet and entertainment, and no plater can afford to miss this convention.

We advised that Geo. B. Hogaboom and John E. Garrick were made a Committee on Technical Papers and they have been working very hard since the appointment. All detailed arrangements have been made as far as the Technical Committee is concerned.

Members should make reservations for accommodations in the hotel before it is too late. We have just received word from the West that a very large delegation is coming and it seems certain that all attendance records will be broken. A very fine program has been arranged for the ladies and there will be taxicabs at their disposal rather than trucks.

There will be space at this hotel for displaying finished products, also for displaying materials used in obtaining these finishes and this space can be had upon application, addressing such communications to G. J. Tyndall, 52 Union street, Attleboro, Mass.

CONNECTICUT VALLEY BRANCH

Headquarters, care of G. E. Vibberts, 31 Crown Street, Hartford, Conn.

A regular meeting of Connecticut Valley Branch A. E. S. was held on March 26, at 747 Main St., Hartford, Conn.

It was decided that the Branch contribute a paper on "Cleaning" for the Providence Convention. Robert Daybill was appointed to take charge of the work of preparing the paper and will have the assistance of any of the members whom he might call upon to help him.

At the April meeting of this Branch, Ladies' Night will be observed when the members, their wives, and friends will hold a "box social" and entertainment followed by dancing.

NEWARK BRANCH

Headquarters, care of Royal Clark, 71 Chadwick Avenue

The annual banquet of the Newark Branch, A. E. S., which was held in Achtel-Stetlers Hall, Saturday, April 21, 1923, was the largest ever held by the Newark Branch. The afternoon session was of exceptional interest, including the following program:

Address of welcome, Oliver J. Sizelove, president; address by chairmen, Walter L. Mitchell, superintendent Tiffany Company; address, Throwing Power in Electro-plating, Dr. W. Blum, Bureau of Standards; address, Dr. Hiram S. Lukens, University of Pennsylvania; address, Dr. H. B. North; address, George B. Hogaboom; address, L. H. Graham; Paper Platinum Assay, F. S. Ray; From the Buyers' Viewpoint, E. S. Kopp, superintendent Consolidated Safety Pin Company; Bright Nickel Plating, Charles H. Proctor, Founder A. E. S.; Master Electro-Platers, Edward W. T. Faint; Rapid Nickel Plating, Royal F. Clark; selected, Horace H. Smith; Black Nickel, John DeMars; Gold Plating, George Reuter; Nickel Plating on Aluminum, DeWitt Moore.

The ladies were guests of the Society and were taken to the Branford Theatre. The banquet was an overwhelming "landslide." Preparations were made for about 175 but when heads were counted, 300 were found seated. Flowers were donated to the ladies by the Celluloid Zapon Company. Envelope openers were donated by J. B. Ford Company; a box with the "Three Flowers" perfume set, by the Newark Branch; a bottle of Orange Blossom Perfume in a genuine California Red Wood box from the Egyptian Lacquer Company; a Japanese hand painted satin pin cushion and a card of rolled gold beauty pins were given to the ladies by the Branch; a leather cigarette case by Egyptian Lacquer Company.

Community singing was indulged in during the repast, led by two professional singers. The first door-prize—a handsome umbrella donated by the Newark Branch for the ladies, was won by a lady from Philadelphia; second door-prize—a handsome ivory manicure set, donated by Schneffel Brothers, Newark, N. J.; third door-prize for ladies, a glass humidor with fancy metal cover, donated by the Elite Novelty Company. First door-prize for gentlemen—a fully nickel plated electric Klaxon horn was won by Mr. Brown of Rahway, N. J. Second prize for gentlemen—a gold mounted Waterman fountain pen and pencil, donated by the Newark Branch. Dancing was held until 1 A. M., when Newark's greatest banquet became history.

PITTSBURGH BRANCH

Headquarters, care of S. E. Hedden, 227 Fifth Street, Aspinwall, Pa.

Wilfred S. McKeon, Chairman of the Publicity Committee of Pittsburgh Branch American Electro-Platers' Society, reports that on Thursday night, April 5th, the Fourth Anniversary of Pittsburgh Branch was held in the form of a reception in the Pittsburgh Bureau of Mines.

A wonderfully sociable evening was enjoyed by the leading spirits identified with the plating craft. A nice dinner was served in the grill of the Pittsburgh Bureau of Mines and was heartily enjoyed by everyone.

Pittsburgh Branch enjoys the distinction of getting closer to the United States Government in its efforts to co-operate with the Plating Craft than possibly any other branch in the country. In the first place, this Branch holds its meetings in the Pittsburgh Bureau of Mines where every facility is at hand for chemical study and research. There is a fine auditorium and members are entitled to the service of free industrial moving pictures and a wonderful laboratory. All these advantages have accrued to this Branch thru the efforts of the following active committee who were in charge of the affair: Chairman, Jos. E. Weigand; Secretary, S. E. Hedden; Moving Pictures, John Corbit; Dinner, Herman Peter; Dancing, Chas. J. Rothfuss; Publicity, Wilfred S. McKeon; Ex-Officio, Elliott S. Corbit.

WASTE MATERIAL DEALERS

Headquarters, Times Building, New York

The Southern Freight Rate Committee of the National Association of Waste Material Dealers on April 24 held a public hearing on its proposal No. 9716, which covered rates on scrap metals, including brass, copper, lead and zinc, minimum 30,000 lbs. from New Orleans, Mobile and Gulf Ports to Ohio and Mississippi River crossings, Chicago, etc.

The rate proposed to Chicago was 53c and the carriers stated

that that rate was based on 27 per cent. of the present first-class rates, and that if necessity should ever arise for rates from other points in the Mississippi Valley that such rates would be established on same basis.

As this proposal would have a widespread effect on the rates from the South, the Manager of the Traffic Department appeared before the Committee at Atlanta, Ga. The Association contended that commodity rates should be established from Southern points to the consuming districts in the North, which would enable shipments to be moved. It was also their contention that the 27 per cent. of first-class basis was too high in view of various decisions of the Interstate Commerce Commission involving rates from Mississippi River points to Arkansas, Louisiana, etc. They contended that rates should be established on not higher than 20 per cent. of first-class. They also asked for the inclusion of scrap aluminum and that the rates be made to apply on straight or mixed carloads.

There was also present at the hearing Mr. J. B. Humphrey of the Metals Refining Company of Hammond, Ind., Mr. F. D. Porter of S. Birkenstein & Sons, Mr. J. H. Hart representing the Loewenthal Company, and other Chicago and St. Louis metal dealers as well as representatives of a number of Atlanta concerns. Among the latter was Mr. Breman of Stein & Company, Mr. Hollowell of T. F. Seitzinger & Sons, Edwin Filton and Mr. Cotton of Thomas E. Grady & Company, who handle traffic matters for a number of Atlanta waste material dealers. It is understood that later in the day Mr. Deifenthal representing New Orleans concerns also appeared before the Committee.

The matter was taken under advisement but it was the opinion of the traffic men in attendance that the carriers will establish the commodity basis from New Orleans and probably from other points where the traffic requires the establishment of such rates.

BRASS MANUFACTURERS

Headquarters, City Hall Square Building, Chicago, Ill.

At the September Convention of the National Association of Brass Manufacturers, the feeling was unanimous that the term "cock" or "cocks" had served its purpose and in the more dignified method of merchandising progress that the plumbing trade has made it was felt, that the word "faucets" should be used for all fixtures to which it would apply in conjunction with the plumbing business, and the word "cock" or "cocks" thrown into the discard.

TESTING MATERIALS

Headquarters, 1315 Spruce Street, Philadelphia, Pa.

As previously announced, the Twenty-sixth Annual Meeting of the American Society for Testing Materials will be held at Chalfonte-Haddon Hall, Atlantic City, N. J., during the week of June 25, 1923. Registration will start Monday, June 25, at 10 A. M. Because of the increased volume of reports and papers that must be considered at this meeting, it has been found necessary to hold thirteen sessions, beginning with the first session on Monday night and closing with the thirteenth session on Friday night, June 29. On Thursday evening and again on Friday morning two sessions will be held simultaneously. Monday morning and afternoon and Wednesday afternoon are reserved for committee meetings.

There is every prospect of this being the largest meeting of the Society ever held. The Chalfonte-Haddon Hall will, we feel sure, be able to take care of our members and their guests in every way. Let every member who can possibly do so attend the meeting and make it the most successful in our history.

Metals.—The Endurance of Metals Under Repeated Stresses is discussed in two papers, one devoted primarily to steel and the other to duralumin and manganese bronze.

Testing.—The entire meeting is replete with valuable papers and reports on methods of testing, covering such topics as babbitt metal, magnetic properties, tool steels, insulating varnishes, paints, concrete, etc. There are also included descriptions of new devices in extensometers, an accelerometer for measuring impact, and a new machine for testing textiles.

FATIGUE RESEARCH

It is now planned to carry forward for the first time a comprehensive research into the endurance limits of copper, brass, bronze and other non-ferrous metals and alloys. The Copper and Brass Research Association will be represented in this undertaking by Captain Harry George, Metallurgist, Chase Metal Works; Mr. W. R. Webster, Vice-President, Bridgeport Brass Company, and Mr. William B. Price, Chief Chemist and Metallurgist of the Scovill Manufacturing Company.

The work will be supervised by an advisory committee of specialists connected with the National Research Council. Dr. H. F. Moore, Professor of Engineering Materials, Materials Testing Laboratory of the University of Illinois, will be in immediate charge of the experiments, which will be conducted at Urbana, Ill. The Engineering Foundation, of which Mr. Alfred D. Flinn is director, has provided special equipment and funds, and is co-operating in other ways in this investigation which concerns everyone.

ENGINEERING STANDARDS COMMITTEE

Headquarters, 29 W. 39th Street, New York.

Among the additional specifications which have been submitted to the American Engineering Standards Committee for comment and criticism, prior to their formal adoption by the Federal Specifications Board—the organization which drafts specifications for all government purchases—are the following: Ingot copper, ingot tin, slab zinc, phosphor copper.

The American Engineering Standards Committee has approved as Tentative American Standard the Standard Method of Test for Flash Point of Volatile Flamable Liquids submitted by the American Society for Testing Materials. The latter society has been appointed sponsor for this standard and in this capacity will publish the standard and direct any revision of it that may later be necessary. The special committee which recommended the approval of the standard was headed by David J. Price, Engineer in Charge of Development Work of the Bureau of Chemistry, U. S. Department of Agriculture.

Eight additional sets of specifications for metals have been submitted for approval to the American Engineering Standards Committee by the American Society for Testing Materials. They are specifications for:

Manganese Bronze Ingots for Sand Castings;
The Alloy; Copper, 88 per cent., Tin, 10 per cent.;
Zinc, 2 per cent. (government bronze, gun metal);
Brass Forging Rod;
Free-Cutting Brass Rod for Use in Screw Machines;
Naval Brass Rods for Structural Purposes;
Brass Ingot Metal, Graded and Ungraded, for Sand Castings;
Solder Metal (soft solder);
High Sheet Brass.

AMERICAN ZINC INSTITUTE

Headquarters, 27 Cedar Street, New York

The fifth annual meeting of the American Zinc Institute, Inc., was held at the Hotel Chase, St. Louis, Mo., on Monday and Tuesday, May 7 and 8, 1923.

MECHANICAL ENGINEERS

Headquarters, 29 W. 39th Street, New York.

The spring meeting of the American Society of Mechanical Engineers will be held in Montreal, Canada, May 28-31, 1923.

BRITISH METAL RESEARCH

The British Non-Ferrous Research Association in order to communicate the results of its recent research investigations to its members has instituted lectures for members only at various industrial centers. Some ten investigations closely connected with difference branches of the metal and engineering trades are proceeding. At one of the private meetings Dr. F. Rosenhain reported upon the investigation of copper and the influence upon its properties of small quantities of impurities which is being carried out in the National Physical Laboratory by Dr. D. Hanson and others. This research promises to be of fundamental importance to the copper and brass industry. Most of the leading British firms are supporting the work. At another meeting Mr. A. E. Bolton, M.Sc., gave a lecture on "The Cause and Prevention of Red Stains on Brass," describing work on this troublesome difficulty which he is carrying out at the Birming-

ham University. A third lecture, which will be open to the public, is to be given in Birmingham and afterwards in Sheffield by Mr. Dartrey Lewis, M.Met., on his work on "Materials for the Abrasion and Polishing of Metals."

UNIVERSITY OF BIRMINGHAM SOCIETY

Headquarters, care of G. E. Vibberts, 31 Crown Street, Hartford, Conn.

The University of Birmingham Metallurgical Society, consisting chiefly of students, is flourishing. An extensive programme of visits to metallurgical and engineering works in the district is being carried out and a number of interesting discussions have taken place upon papers given by leading metallurgical experts. Among the subjects of the papers have been "Some Defects in the Manufacture of Brass Tubes;" "The Metallurgy of a Cartridge Case," by Dr. H. W. Brownsdon, of Kynochs, Ltd. (of the Nobel Industries Combine) and "The Mechanical and Electrical Properties of Some Nickel Alloys," by Mr. W. R. Barclay (H. Wiggin & Co. & The Mond Nickel Company, Ltd.). At an inter-University Metallurgical Conference arranged by the Society in Birmingham, delegates from Sheffield, Manchester, Swansea, Leeds and Glasgow attended. A discussion took place on "University Methods of Training in Metallurgy," and a number of improvements were suggested. A constitution for future conferences was adopted and at the concluding meeting an address was given by Professor T. Turner. Visits were paid by the delegates to the Birmingham Section of the British Industries Fair, and the works of Elliotts Metal Company, Ltd. and W. & T. Avery, Ltd.

Personals

A. W. Crozier has been transferred to the Philadelphia office of the Norton Company, Worcester, Mass.

Walter Goodenough has joined the staff of Dwight P. Robinson & Company, Inc., 125 East 46th street, New York, and will take part in the various activities of that company.

Charles Piez, of the Link-Belt Company, Chicago, Ill., has been elected a director of the Walworth Manufacturing Company, Boston, Mass., succeeding Richard F. Hoyt, resigned.

D. J. McAvoy has been made general superintendent of the Bryan Pattern & Machine Company, Bryan, Ohio, and will be in direct charge of the foundry and pattern departments. Mr. McAvoy was formerly general foundry foreman of the Bunting Brass & Bronze Company, Toledo, Ohio.

Thomas W. Pangborn, president of the Pangborn Corporation, Hagerstown, Md., succeeds Edward L. Langworthy of the Adams & Westlake Company, Philadelphia, as a member of the third district committee of the National Founders' Association, of which William H. Barr is president.

John C. Bennett, formerly a mechanical executive with the Stevens-Duryea Automobile Company, and the Fisk Rubber Company, and recently resigned as manager of purchases and production of the Hampden Grinding Wheel Company, Springfield, Mass., has been appointed manager of a New England office which the Marf Machine & Die Casting Company, Brooklyn, N. Y., has opened at 51 Harrison avenue, Springfield, Mass.

Raymond G. Hutchinson, chief engineer of the Michigan Copper & Brass Company, has resigned, effective May first. Mr. Hutchinson was with the American Brass Company for eighteen years, and from 1917 to 1921, superintendent of its Buffalo branch. For several years before going to Buffalo he was located at the main office, Waterbury, Conn., as plant layout engineer, specializing on process work, efficiency and conveying equipment.

Deaths

JAMES McGEE

James McGee, who was connected with the Dempsey Brass Foundry, Lynn, Mass., died on March 10, 1923, in Lynn.

THADDEUS STEVENS

Thaddeus Stevens, foreman of the brass foundry of the General Electric Company, Lynn, Mass., died after a brief illness at his home, 359 Lincoln avenue, Cliftondale. Mr. Stevens was born in Lubec, Maine, July 19, 1851.

EDWARD WEBSTER

Edward Webster, who was for many years with the Rundle Spence Manufacturing Company of Milwaukee, well known in the plumbing trade, died April 13, 1923. Mr. Webster was manager of the Sanitary Department of the above company.

CHARLES J. MESTA

On March 6, Charles J. Mesta, aged 50, died as a result of a bullet wound. He was sales manager of the Mesta Machine Company, West Homestead, Pa., and was formerly associated with the engineering department of the Leechburg Foundry & Machine Company, Leechburg, Pa.

MARK W. RAY

Mark W. Ray, vice-president of the Lava Crucible Company, Pittsburgh, Pa., died February 4th at his home in that city. He came to Pittsburgh thirty years ago to become a member of the firm of Ray, Weller & Company, public accountants, of which he was one of the organizers.

DANIEL W. TOWER

Daniel W. Tower died February 12 following an operation. He was born August 13, 1855. Mr. Tower was interested in mechanical affairs, even in his childhood, and in 1882 established the first brass foundry in Grand Rapids, which was the nucleus of what is now the Grand Rapids Brass Company.

E. L. WRIGHT

E. L. Wright, whose unexpected death occurred at his home in Pittsburgh, Pa., March 21, after a few days illness of pneumonia, was associated with his father, the late Homer Wright, manufacturers of trimmings for table glassware, in business 85 years under the well-known firm name Collins and Wright.

JACOB G. KASJENS

On April 13 Jacob G. Kasjens passed away in his home in Peoria, Ill., at the age of 53, after an illness of two months. Mr. Kasjens was a prominent brass foundryman. In his youth he learned the steam-fitting trade with the firm of Klingle Bros., and in 1895 became associated with E. B. Hazen and the late Arthur T. Ancliffe in the Brass Foundry & Heating Company. Eventually, he became president of the Brass Foundry & Heating Company and also served as vice-president of the Kasjens Plumbing Company, in which he was associated with his brother.

A reprint of a page written by Mr. Kasjens for the American Foundrymen's Association will be found on page 186 of this issue.

ALBERT DANIEL FIELD

Albert Daniel Field of Waterbury, 69 years of age, president of the Shoe Hardware Company, died April 4, 1923 at the Waterbury hospital. The factory was closed Friday afternoon out of respect to his memory, the funeral being held at the First Baptist Church with Rev. David P. Gaines and Rev. Horace B. Sloat officiating. He was born in Columbus, O., but came to Waterbury in 1887 and was associated with Chapman & Armstrong, manufacturers of brass goods. He also worked in Bridgeport and Naugatuck brass shops, returning to Waterbury in 1897 to take charge of the Shoe Hardware Company.

NEWS OF THE INDUSTRY

BUSINESS REPORTS OF THE METAL INDUSTRY CORRESPONDENTS

WATERBURY, CONN.

MAY 1, 1923.

Late winter activities of radical groups endeavoring to unionize the unskilled laborers of the local brass factories have apparently come to naught. **Carlo Tresca**, who was prevented three times from addressing local workmen by the police, has apparently given up the attempt. After the refusal to let him speak he applied for an injunction to prevent the police interfering with him. His petition has just been denied by Judge Haines of the Superior Court, the latter holding that as no irreparable injury was done he had no authority to issue an injunction.

As a result it is believed he will not again attempt to come here although he threatened to keep coming until he was allowed to speak. It was understood that his services were desired here to assist in forming a union of the unskilled brass workers, similar to the **New England Workers' Association** which brought on the strike here three years ago. Talk of forming such an association and of a strike, common a few months ago, has now largely disappeared due to the granting of at least three wage increases since last fall.

William B. Price, chief chemist and metallurgist of the **Scovill Manuacturing Company, Capt. Harry George**, metallurgist of the **Chase Companies**, and **W. R. Webster**, vice president of the **Bridgeport Brass Company**, are planning to carry forward in the **Copper and Brass Research Association**, for the first time a comprehensive research into the endurance limits of copper, brass, bronze and other metals and alloys. The work will be supervised by an advisory committee of specialists connected with the National Research Council. **Dr. H. F. Moore**, professor of engineering materials, materials testing laboratory of the **University of Illinois**, will be in immediate charge of the experiment.

The **Interstate Commerce Commission** has dismissed the complaint of the Bristol Brass Corporation against the New York, New Haven and Hartford Railroad Company, in which the complainant held that rates on brass from Bristol to New York lighterage deliveries during Federal control of the railroads were discriminatory, pointing out that lower rates obtained from other points in Connecticut, such as Waterbury, Waterville, Torrington, Thomaston and Wallingford. The shipments of the Bristol concern consisted of brass strips or sheets adapted to the manufacture of cartridge shells consigned to New York under contract with the Italian government. The railroad claimed that the lower rates obtaining from certain points other than Bristol represented a subnormal condition, having been forced by lower rates on this traffic from Rome, N. Y., to the same destination, and were compelled by water competition through the Erie canal.

Cornelius E. Kelley, president of the **Anaconda Copper Mining Company**, which controls the American Brass Company, was the principal guest of honor at the annual banquet of the Ansonia Chamber of Commerce last month. He traced the rise of the Anaconda Company and reassured the Ansonians that the policy of the company would not be to move the business of the American Brass Company away from Ansonia or other cities in the valley. Its employees in Ansonia, Waterbury and Torrington have nothing to fear from the new management, he said.

After one year of consolidated efforts, the Anaconda Company was most pleased and satisfied with the co-operation shown by the subsidiary and he believed the same feeling was reciprocated. The Anaconda seeks to build up and fortify the subsidiary rather than undermine it, he said.

The officers and principal salesmen of the **Seth Thomas Clock Company** have been ordered to appear at a hearing before the Federal Trade Commission in New York for an examination of the company's books and to give their reasons for unwillingness to sell to jobbers who decline to maintain a recommended retail price in the sale of Seth Thomas clocks. The alleged hesitancy in selling to jobbers who will not retail at prices suggested by the manufacturers is opposed by the trade commission. The case is somewhat similar to that of the Beechnut Packing Company in New York courts some time ago in which that company was arraigned for dictating retail prices to jobbers and refusing to supply those who sold below the prices set by the packers. The Seth Thomas case differs in that the clock company merely requested certain prices instead of demanding adherence to this scale. The Seth Thomas clocks sell largely in jewelry stores and the company has wished to discourage price cutting and selling by mail order and stores at reduced prices.—W. R. B.

BRIDGEPORT, CONN.

MAY 1, 1923.

Skilled workers to the number of 500 will be employed in the manufacture of dictaphones, it was announced here last month, with the completion of the organization of the **Dictaphone Company**. The company purchased some of the patent rights and manufacturing equipment of the **Columbia Graphophone Company** and leased buildings at Howard avenue and Cherry street. **H. J. King**, general factory superintendent, in making the announcement declared that the company through the consolidation of all branches of manufacture here, would take into its own employ molders, japaners, polishers, buffers and electroplaters, press operators, die setters, tool makers and screw machine operators.

The reorganization has been attended by a well-planned financial foundation which will permit of enlarging operations as requirements demand. It is also planned to establish in connection with the plant a school for the training of young women in the use of the dictaphone. Mr. King was for 30 years with the **New Haven Clock Company, J. M. Lucarelle** is to be superintendent of production of the new concern, **Charles Gray, Fred Conlin, Charles Ecklund** and **Otto Steinoff**, foremen.

L. W. Wallace of Washington, executive secretary of the **Federated American Engineering Societies**, addressed the engineers of this city at the meeting last week of the local branch of the **American Society of Mechanical Engineers**. Large delegations of engineers were present from other cities in the state. He described the progress of the movements to unify the engineers of the nation through the Federated American Engineering societies, the movement begun under the leadership of Herbert Hoover several yars ago and spread to all sections of the country, the federation now consisting of 30 national and local engineering societies.

The **Reising Arms Company** has filed a petition in bankruptcy, declaring liabilities of $124,743.36 and assets of $77,691.92. The concern was among those prominent in the manufacture of implements and ammunition during the war and has since done little business.

The **Burns Bassick Company** of this city is the central figure in negotiations which will culminate in the formation of a $10,000,000 organization by consolidation of several smaller firms with the local concern. The new firm will be the **Bassick Alemite Company**. E. W. Bassick, president of the Bassick Company here and in Chicago will head the combined concern. They will issue $5,000,000 in preferred stock and 200,000 shares of common stock. Among the concerns taken in are the **M. D. Shenck** of Meriden, the **Universal Caster Foundry** of Newark, **Heron Manufacturing Company** of Utica and the **Bassick Manufacturing Company** of Chicago.

A 12½ per cent increase in wages was announced April 16th for the employees of the **Dunham Mills, Inc.**, of Naugatuck and the schedule reduced from 54 hours a week to 50 hours a week. The factory will close afternoons at five o'clock and operate only five hours on Saturday. Heretofore the shop has operated on a 10 hour a day basis.—W. R. B.

TORRINGTON, CONN.

MAY 1, 1923.

The Union Hardware Company during the past month awarded to the Torrington Building Company the contract

for a big addition to its plant. The contract, it is said, involves close to $100,000. The addition is to be 102 x 183 feet, two stories in height with basement beneath and will adjoin the present office building of the company. It will be of brick and concrete construction. Work is to be started immediately.

A certificate of incorporation has been filed by the **Altman Manufacturing Company,** hardware products, capitalized at $50,000 with $6,000 paid in. The incorporators are Alexander Altman, Charlotte Altman and William A. Gleeson.

The **Diamond Needle & Manufacturing Company** has filed a certificate of incorporation with capital stock of $50,000 divided into 2,000 shares. The incorporators are J. H. Richards, Oscar Snay and E. E. Mackintosh, all of Torrington.

Wadsworth Doster, formerly treasurer of the **Torrington Manufacturing Company** and later vice president of the **Sundh Engineering Company** of Philadelphia, is now with the **Blake & Johnson Manufacturing Company of Waterbury.** The Blake & Johnson company has purchased the Sundh design patents and Mr. Doster is manager of the new department of the concern.

The **Torrington Co-operative Company** has purchased the assets of the **Torrington Homes Corporation.** The Homes Corporation was formed by the manufacturers during the war period for the purpose of helping relieve the housing situation. The authorized capital stock was $100,000. Frank J. Damon of the Union Hardware Company was president and F. H. Griffiths of the Turner & Seymour Company, treasurer.

Alfred Cooper, son of **Charles S. Cooper,** assistant superintendent of the **Torrington Branch** of the **American Brass Company,** was married April 18 in Torrington to **Miss Edna May Blakeslee.** Mr. Cooper is engaged in the accounting department of the brass company.

Census bureau estimates place Torrington's present population at 23,935.—J. H. T.

NEW BRITAIN, CONN.

MAY 1, 1923.

Trade conditions among the New Britain factories continue excellent, with no decline noted and no evidence that there is to be any. Several concerns still continue to operate overtime shifts, this being especially noticeable at **Landers, Frary & Clark** and some branches of the **New Britain Machine Company.** While there is no falling off in the cutlery business at the Landers, Frary & Clark plant, there is decided increase in the demand for the varied assortment of electrical products manufactured there and this branch is unusually brisk. The machine company seems to be headed toward a firm foundation again and with good orders coming in there is reason to believe that eventually this company will return to its former place as a leader. The **Corbin** factories all are doing good business in the builders' hardware line and the **Stanley Works** also is getting a goodly share of the business. The **Stanley Rule & Level Company** too, finds a brisk demand for its varied assortment of carpenters' tools.

There is neither curtailment of working hours or laborers here, in fact the chief difficulty remains in finding enough workers to fill the jobs that are open. Of labor trouble there is not the slightest trace and indications point to a brisk summer's trade, with probably an upward revision of process in many products.

The **Colonial Brass Works** of New Britain has bought in the nearby town of Plainsville the electro-plating plant of Henry C. and Alice T. Baum, which includes, a two-story factory building and about eight acres of land. To this plant some notable changes will be made, including the adding of a foundry, and the brass company's present force of employees will be increased about fourfold. Possession of the Plainville plant will be taken about June 1.

Mr. Baum will begin work at once upon the erection of another plant, near the old one, and it will be constructed with a view to providing larger quarters and future growth. —H. R. J.

ROCHESTER, N. Y.

MAY 1, 1923.

There has been little or no change in the situation in Rochester during the month of April. There has been no slowing down of output in the various metal-using plants about the city, although it is expected that May will witness a gradual letdown all around. Continued cool weather has apparently stimulated business to a certain extent. Some concerns have been adding to stocks of materials, in anticipation of higher prices later in the year.

Business in the metal plating shops and brass foundries is unusually brisk at this time. In any event it is 50 per cent. better than a year ago, and molders and platers feel confident that the present year will prove to be a most prosperous one to the industry. All resident platers are regularly employed and have been almost continuously since the first of the year.

Retail dealers in brass, copper, aluminum and tin report a largely increased demand owing to the growing demand for radio installation.—G. B. E.

DETROIT, MICH.

MAY 1, 1923.

Like all other Detroit industries, the brass, copper, aluminum and gray iron business is forging ahead as it has not done since the trade boom just following the great war. At present things look as if present conditions were going to continue for a considerable time. Some say two years at least and perhaps longer.

Of course the automobile business is largely responsible for the wonderful revival of business here. These plants, which use great quantities of brass, copper and aluminum parts, are forced to call on outside plants to do much manufacturing. The result is that scores of small concerns are kept busy.

Revival of the building trades also has stimulated buying of building hardware and manufacturers in this line are working to capacity.

Transportation is still causing more or less trouble here. Manufacturers find considerable difficulty getting cars and at the same time it is impossible to unload raw materials as quickly as desired owing to the scarcity of help.

Wages have shot skyward, not only among skilled mechanics but among common labor as well. Detroit is somewhat better fixed than many surrounding cities, for it is drawing heavily on Canada for labor, and great numbers of people are crossing the border daily to engage in work here.

The summer has a most exceedingly fine outlook. No strikes are in sight and manufacturers express themselves enthusiastically for the future.—F. J. H.

PITTSBURGH, PA.

MAY 1, 1923.

There has been no halt in the trade recovery of the nonferrous metal industries in Pennsylvania. Business is still on the upswing. The fact is quite unmistakable. Every barometer of trade in these industries continues to present the forecast of "fair weather ahead."

The most alarming situation is the increasing labor shortage, which has become accentuated in the past month. All the industrial plants which are engaged in the metals business report a shortage of common labor, likely to become more pronounced as warm weather advances, drawing men from the plants to forms of outside work. Already several interests have marked up the common labor wage rate from 36 to 40 cents per hour, which promises to become general throughout the disrict.

The **Westinghouse Electric & Manufacturing Company,** of East Pittsburgh, Penna., announcing that it is planning to start its Sharon factory which it acquired six months ago from the Savage Arms Corporation. Transformers will be built and employment afforded at the start to 1,000 hands. This number will be increased to 2,500 before the end of the year.

A Baltimore dispatch says the **Standard Sanitary Manufacturing Company,** with big plants in Pittsburgh, has acquired 48 acres in Baltimore, and that they will erect a new plant there for manufacture of cast iron sanitary enamel ware. The investment for the first unit will be $3,000,000.—H. W. R.

CHICAGO, ILL.

MAY 1, 1923.

In the Chicago metal trade reports from manufacturers and distributors indicate a record-breaking business for the month. Labor conditions and the price advances recently announced, however, are complicating factors in the situation. The scarcity of material has in some cases resulted in a slight let-up of orders, particularly where manufacturers have put in orders as far as three months ahead so as to be sure of their material. An interesting comparative statement issued by the **American Brass Company** shows advances ranging around one cent in the prices of brass sheet, bronze and sheet copper since February 26.

H. L. **Woodruff,** of the **Atlas Copper & Brass Manufacturing Company,** declares that the main difficulty his company is experiencing is that of getting adequate labor. This seems to be the case with practically all the trade in this section. In the words of Mr. Woodruff, "it is the biggest year since the war." They have the orders but cannot get men to turn them out. Mr. Woodruff advertised for machinists for two weeks and did not get a single answer. The shortage is in both skilled men and helpers.

Deliveries from the mills are often delayed as much as from six to eight weeks. Some foundries hereabouts are so heavily stocked up with advance orders that they are now declining new business.

A little different story was told by the **Mineral Point Zinc Company** in regard to zinc. The common metal, which was priced at eight cents in March is now down to seven cents. This is the grade of zinc used for galvanizing pails, tubs, etc. As production is holding up, and also consumption, they cannot account for the drop in price. On the Grade A Zinc there is a strong market, however. It is only the common metal which has gone down in price.—E. J. C.

BOSTON, MASS.

MAY 1, 1923.

Brass foundrymen are enjoying an unusually large volume of business at the present time. Some are now at the point where it is necessary for them to refuse a great deal of the new business offered, while one foundry manager expressed the opinion that he had enough business in sight to warrant a plant double his present capacity. Plumbing dealers report a growing demand for supplies and spring business is progressing at a satisfactory rate. High prices of plumbing supplies and other materials have not, as yet, retarded building operations to any noticeable extent except in the case of a few small projects. It is thought that the momentum of the building boom is such that high costs will have no immediate adverse effect. One of the large dealers in lead products, however, finds that high prices in his line has tended to restrict buying to some extent and his April business has not shown the improvement expected.

Gardner Screw Corporation, of Gardner, has been incorporated with a capital of $100,000 to handle metal and wire specialties by Theodore J. Hoglund, C. Leslie Bent, Elmer W. Crouch, Bernard L. Cohen, Edward S. Dow, Edmund L. Nichols, Carl H. Hedstrom and Walter L. Beaman, all of Gardner.

Quality Hardware Supply Company, of Cambridge, has been incorporated with $15,000 capital by Louis Roseman, Benjamin Roseman, Sam Povza and Roman V. Muslow, all of Cambridge.

Apex Electrical Distributing Company, Inc., of Mass., has been incorporated with $150,000 capital to handle electrical and automatic appliances. The incorporators are Elizabeth Weber, of Lynn, Irene Craig and Leopold M. Goulston, of Boston.

Decorative Metal Company, of Taunton, has been incorporated with $50,000 capital by Elihu G. Sibley, Charles S. McNulty and Bertram J. Toolin. They specialize in enamelled goods.

Consumers Plumbing & Heating Company, of Brockton, has been incorporated with $20,000 capital to handle hardware, plumbing and heating apparatus by Grant D. Anthony, of Brockton, and others.

Condit Electrical Manufacturing Company, of Boston, has been incorporated with $200,000 capital. The incorporators are Sears B. Condit, A. Thaxter Parsons and L. Alberta Smith.

Yale Electrical Supply Company, of Boston, has been incorporated with a capital of $25,000 to deal in electrical fixtures. The incorporators are Charles H. Weinreb, Charles Karfeld and Charles Jacobs, all of Boston.

C. H. Cronin, Inc., of Boston, has been incorporated to handle plumbing supplies and household furnishings, with $25,000 capital. The incorporators are Cornelius H. Cronin, William C. Cronin and Edna B. Kenworthy, all of Boston. —C. W. R.

TRENTON, N. J.

MAY 1, 1923.

The **Jordan L. Mott Company,** one of the largest concerns of its kind in the country, has placed the Trenton plant on an efficiency basis. This required many additional clerks and other help to keep tabs on every piece of goods that is being turned out. Every piece of material and finished product is weighed and tested and everything must be up to the standard. The new plan will mean considerable expense to the Mott Company. The many employees of the Mott Company recently petitioned the management for an increase in wages, but this was denied by notices posted in the plant.

The **Gorman Silver Company** will have a big exhibit at the industrial show to be held in the Art Alliance Building, Trenton, N. J., from May 1 to 22.

Elite Lamp & Novelty Company, of Trenton, N. J., has been incorporated with $250,000 capital to make and deal in lamp fixtures. The incorporators are Joseph H. Goldstein, Mayme Simons and Joseph Simons, all of Trenton.

William Steinen & Company, dealers in metal goods, of Newark, N. J., has been incorporated at Trenton with 500 shares, no par. The papers were filed by Frederick Stoddard.

Camden Materials Company, of Camden, N. J., has been chartered at Trenton with $250,000 capital to deal in hardware. The incorporators are Henry T. Rittman, John B. Katts, of Collingswood, N. J., and J. M. Carey, of Camden.

Imperial Radio Corporation, of Jersey City, N. J., has been incorporated at $500,000 capital to manufacture radio appliances. The incorporators are E. Russell Carlile, R. E. Albin, New York, and O. E. Grant, of Canada.

Hudson Jewelry Company, of Newark, N. J., has been incorporated at Trenton with $50,000 capital, by Simon L. Fisch.

The **Radio Shop, Inc.,** of Newark, N. J., has been incorporated at Trenton with $50,000 capital to deal in radio supplies.

The **Westinghouse Lamp Company,** with a factory at Trenton, N. J., will erect a new plant at Belleville, N. J., to be used for the manufacture of brass bases for incandescent lamps. These bases will also be supplied to the Trenton concern.

William L. Dill, of Paterson, and **Bernard Mindes,** of Newark, have been appointed custodial receivers of the **Knickerbocker Manufacturing Company,** of Belleville, N. J., by Judge Runyon. The concern, which has been manufacturing cutlery and hardware since 1908, has assets amounting to about $250,000, while the liabilities are fixed at $225,000, of which $160,000 are unsecured. It is contended that the concern is without sufficient funds to meet past due obligations.—C. A. L.

PROVIDENCE, R. I.

MAY 1, 1923.

Practically all lines in the metal trades throughout the State are enjoying their greatest boom since the beginning of the nation-wide depression that has handicapped industrial progress of the country so many months. Everyone is operating on a full day schedule to full capacity, or nearly so, and in many instances it is said that there are sufficient orders on hand to keep the plants going at the present pace throughout the greater part of 1923. Many concerns are advertising for help, both experienced and inexperienced, both classes of which, according to the factory officials, is unusually scarce. With no labor controversies either as to

hours or wages to cloud the situation, and with plenty of orders in sight the prospects for the future are considered as being especially encouraging.

The **M. F. Williams Company, 407 Pine street,** has commenced the erection of a new factory building on Manucentre, off Eddy street. It will be one story, 50 x 160 ft., with an ell 30 x 50 ft. and will have a basement. It will be of brick and steel construction, with no obstructing posts.

Workmen in an **Attleboro Manufacturing** jewelry plant has been busy the past month fashioning a lot of "keys to the city of Boston," which Mayor Curley will present to distinguished visitors. The small, gilded brass key which the Mayor of Atlantic City, N. J., gave to Mayor Curley on the occasion of his visit there last winter, is a type of key which appeals to Mr. Curley as superior to the type which he has been presenting. On the handle of the new Boston key will be facsimiles of the State and city seals. The prong will be made up of a combination of the initials "C. B." for the city of Boston in the same way in which that of the Atlantic City key consists of the letters "A. C."

The **H. F. Barrows Company** has been incorporated for the manufacture of Jewelry at North Attleboro, with a capital of $150,000. The incorporators are H. F. Barrows, Donald A. Barrows and Louis D. Barrows. There are 1,500 shares and H. F. Barrows owns 1,498 with D. A. Barrows and L. D. Barrows owning one each. Louis D. Barrows is president and Donald Barrows treasurer and clerk. The new corporation succeeds H. F. Barrows & Co., which is one of the oldest manufacturing jewelry concerns in North Attleboro.

Duncan J. Greenhaldge, for ten years managing director and assayer of the **Jewelers' and Silversmiths' Co-operative Refining Company,** of North Attleboro, has resigned that position and has started in business for himself at Attleboro Falls, where he has established a modern up-to-date refinery, under his own name.

PLATERS CONVENTION

Everything is shaping up well for the next annual convention of the American Electro-Platers Society, which will be held in this city July 2, 3 and 4, as the guests of the Providence-Attleboro Branch. The headquarters will be at the new Providence-Biltmore Hotel, where the business sessions will be held and which will be the centre of the social activities. The Providence-Attleboro Branch will be assisted in its efforts to make this convention not only a successful one in every sense, but also the banner occasion in the history of the society.

Plans have not as yet reached such a concrete form as to be announced, except in the general way that in addition to the routine business, reports of officers and committees and the election of officers, there will be a number of papers and discussions presented by recognized authorities on subjects pertaining to and connected with the industry; demonstrations, visits to local electro-plating and other industrial establishments for which Providence is famous, and other features of a practical character.

On the social side there will be automobile rides, visits to public buildings and points of interest, luncheons and dinners and on the final day, an outing such as only Rhode Island can stage—a sail down Narragansett Bay to Newport—the City-by-the-Sea, the "Playground of the country's aristocracy" —where a genuine Rhode Island shore dinner will be served following a trip over the famous ten mile drive. All in all the electro-platers of Providence, the Attleboros and vicinity are out to show their associates throughout the United States what a convention should be. They want everyone to come, and come early and stay late.—W. H. M.

OAKLAND, CAL.

MAY 1, 1923.

The metal industry in Oakland from the standpoint of the finisher is in the best financial condition that it has been in for many years past. All of the shops are busy and crowded with work of every description largely due to the tremendous growth of the factories. It is now estimated that some two thousand factories are located here covering a wide variety of manufactured wares and in a large measure having to do with the metal industries.

The principal metal finishing plants here are as follows: Oakland Plating Works 1744 Telegraph avenue; Johnson and Harris, 2542 Telegraph avenue, Progressive Plating Works, 857 Twenty-seventh street; Haws Plating Works, 1808 Harmon street; Oakland Retinning Company, 106 Adeline street.

In addition to this list of plants doing business for the trade a number of plants have their own metal finishing departments such as the Standard Brass Casting Co., 3rd and Jefferson streets; California Wire Cloth Company, 1001 Twenty-second avenue; Marchant Calculating Company, Powell and Landgreen streets; Berkeley Westgate Metal Products Company, Forty-seventh avenue and East Twelfth street, and the Coast Die Casting Company, 4069 Hollis street, Emeryville.

Good prices prevail and wages are about standard, but it is stated that good workmen are scarce; most of those applying for jobs are far from experts.

The automobile factories here use a lot of metal and metal finishing, particularly the Chevrolet, Durant, Star and the Fageol besides two tractor factories.

MONTREAL, CANADA

MAY 1, 1923.

Business in the metal line is in a highly satisfactory condition. Production is beginning to reach the peak of 1920 and consumption of goods manufactured and raw materials is keeping pace with it. Thus far there are no accumulations of supplies beyond normal requirements.

The Garth Company, Craig street, are very busy on improvements for pulp and paper mills and are employing a large force. The shipbuilding business in this section is very quiet. Some of the shipbuilders are employing quite a few hands on repair work as this is the time when ocean navigation opens on the St. Lawrence. The locomotive and railroad shops are running full capacity on new work, also on repairs.—P. W. B.

BIRMINGHAM, ENGLAND

APRIL 20, 1923.

Amongst the busiest people in the non-ferrous metal trades at the moment are the wire drawers. Interest in broadcasting is increasing and the demand for wire for aerials and other purposes connected with radio-telephony has proved a boon to the trade. One order to a Midland firm for copper wire aerials amounted to a million feet. Amateurs in wireless are anxiously awaiting the decision of the Postmaster-General as to the terms on which licenses will be given to users of home-made receiving sets.

Taking the metal trades generally, continued progress has been made since the beginning of the year, particularly in overseas business. Work in the rolling mills showed a slackening at the beginning of April, but improvement has now set in. The manufacture of terminals and other parts for wireless telephony has made up for deficiency in other work in the brass shops and has particularly benefited the makers of extruded rods. Cabinet brassfounders are experiencing a good demand at home for both cabinet and builders fittings and in the latter department especially, a decided revival of export business. In steam, gas and water export trade with the British Dominions has been maintained, whilst the Indian market shows a decided reopening. Revival of business with European countries has been stimulated by the fact that Continental manufacturers are suffering from difficulties arising out of the Franco-German embroglio.

The one trade which shows no sign of renewed life is the jewelry trade. Silversmiths and electro-platers find demand both for home and export constantly fluctuating and the average business is less than moderate. Aluminum foundries have benefited by a revival in the motor and other trades for which they cater. Better business is being done by makers of aluminium hollowware. German competition, as the result of the tariff and of manufacturing difficulties in Germany, having become much less severe.

An association of users of brass and copper sheet and strip has been formed with Birmingham as its headquarters. The membership is restricted to users of not less than 140 tons of strip per annum and the chief object of the association is to obtain by collective negotiation with manufacturers special rebates to large buyers.—G.

Business Items—Verified

S. Schwartz & Son, Two Rivers, Wis., announces change in their name to Schwartz Manufacturing Company.

Hardinge Company, 120 Broadway, New York, reports the sale of five conical ball mills and three pebble mills.

G. J. Nikolas & Company, Chicago, Ill., have changed their Brooklyn address from 77 Broadway to 33-35 Grand street.

The Chicago office of the **Zeller Lacquer Manufacturing Company,** New York, is now located at 551 W. Lake street.

The **Prentiss-Wabers Stove Company,** Wisconsin Rapids, Wis., has increased its capital, and expects to erect a building some time this summer.

Belmont Metal Ceiling Company, 2502 Webster avenue, New York City, will commence the erection of a new one and one-half story plant, 40 x 75 ft., on Chatterton avenue.

Bridgeport Brass Company, Bridgeport, Conn., announces the removal of its New York offices from the Woolworth Building to the Pershing Square Building, Park avenue between 41st and 42d streets.

Plant No. 1 of the **Hill & Griffith Company,** Cincinnati, Ohio, was burned out recently, but it is being rebuilt at once. All orders are being filled promptly from the No. 2 plant and from Birmingham, Ala.

Plans are under way for a new 3-story fireproof reinforced concrete unit, 60 x 100 ft., for the **Wolverine Brass Works,** facing on Bond avenue, Grand Rapids, Mich., to house the pattern and grinding departments.

The **C. O. Jelliff Manufacturing Corporation,** wire cloth, screens, etc., Southport, Conn., has opened a New York office at 350 Madison avenue. H. F. Chase, formerly with the International Nickel Company, will be in charge.

The **Royal Brass Company,** 1420-22 East 43rd street, Cleveland, Ohio, awarded the contract for the construction of a one-story, 40 x 69 ft., addition to its factory for assembling, testing, casting, grinding, etc. Estimated cost $5,000.

Central Brass Company, 6203 Cedar avenue, Cleveland, Ohio, awarded the contract for the construction of a 1-story, 102 x 140 ft. brass foundry on East 55th street and Bragg Court. Estimated cost $50,000. H. H. Klein is secretary.

The **W. W. Sly Manufacturing Company,** foundry equipment, 4700 Train avenue, Cleveland, Ohio, has established a Chicago office in the Fisher Building, 343 South Dearborn street, and a Detroit office in the General Motors Building.

The **West Bend Aluminum Company,** West Bend, Wis., sustained an estimated loss of $85,000 by fire on March 24th. The temporary warehouse building was destroyed and contained surplus stock of finished goods. This temporary warehouse has been repaired.

The opening of a Philadelphia office is announced by **Dwight P. Robinson & Company,** 125 East 46th street, New York. The new office will be under the direction of Carl A. Baer, and a consulting engineer in the design of industrial, textile and power plants.

The **J. B. Ripley Brass Foundry Company, Inc.,** Windsor, Vt., has been incorporated with a capital stock of $10,000 by J. B. Ripley, president and manager, A. M. Ripley, treasurer. This concern operates the following departments: brass, bronze and aluminum foundry.

The **Connecticut Brass Foundry Company,** 660 East Main street, Waterbury, Conn., will build a new addition to its plant, 1-story, 25 x 40 ft. Henry F. Wenzel, Waterbury, is architect. This concern operates the following departments: brass, bronze and aluminum foundry.

Winsted Hardware Manufacturing Company, Winsted, Conn., has let contract for a one-story, 44 x 146 ft. addition. Building operations have been started. This firm operates the following departments: tool room, cutting-up shop, plating, stamping, tinning, soldering, polishing, lacquering.

The brass foundry of the **John B. Douglas Company,** Cincinnati, Ohio, will be moved shortly to the company's new plant at Carthage, Ohio. New equipment will be bought next fall. This firm operates the following departments: brass foundry, brass machine shop, tool room, grinding room.

The **Newark Metal Manufacturing Company,** Newark, N. J., has leased an addiional floor in the building at New Jersey Railroad avenue and Hamilton street, for extensions. Additional machinery will be installed. This firm operates the following departments: tool room, plating, stamping, lacquering.

The manufacture of phenol (carbolic acid) will soon be under way in a plant now being constructed near Cleveland, Ohio, by the **Bakelite Corporation** of New York. Phenol is used for the manufacture of synthetic resins, for dyes, pharmaceutical preparations, disinfectants, and many other purposes.

The Frost Manufacturing Company, Kenosha, Wis., is erecting an addition to its brass foundry at an estimated cost of $35,000. This firm operates the following departments: brass, bronze and aluminum foundry, brass machine shop, tool room, grinding room, cutting-up shop, plating, stamping, soldering, polishing.

Societe Anonyme pour l'Industrie des Metaux, Lausanne, Switzerland, have taken over the aluminum and metal business of "Le Mineral Societe Anonyme." The latter company will continue to trade in bauxite and chemical products. **C. W. Leavitt & Company,** New York, are sole selling agents in the United States for both corporations.

A new gondola car dumper has been designed by the **Link-Belt Company,** 910 S. Michigan avenue, Chicago, Ill. Its construction is said to be so simple and so well balanced in design that it is not only very reasonable in size but it can be operated by anyone, however unskilled. It requires but 35 to 45 horsepower to operate.

The Anaconda Copper Company, Akron, Ohio, is planning for the immediate construction of a new building at its recently established zinc oxide plant in the North Akron section. The works is giving employment to about 150 men and this force will be increased in the near future. This firm operates the following departments: smelting and refining.

Fires in Staten Island recently caused damage of more than $1,000,000. The worst blaze in that borough did $700,000 damage to the plant of the **Tottenville Copper Company,** virtually destroying it. The fire started apparently in a brick workshop. The Tottenville Copper Company is a subsidiary of the Nassau Smelting & Refining Company of New York.

Forse Machine Company, Anderson, Ind., producer of die-castings of aluminum, white brass, tin base metals and other alloys has recently acquired an additional one-half block of ground at the corner of 14th and Fairview streets for the purpose of enlarging its facilities and producing die-castings on machines of its own construction, which enables it to produce small castings very advantageously.

The Gluntz Brass Foundry Company, 2010 Elm street, Cleveland, Ohio, began operations January 1st producing a line of general castings in aluminum and the non-ferrous alloys up to 1,000 pounds each in weight, with a total present capacity of about 3 tons daily. Daniel J. Gluntz is president and general manager. This concern operates the following departments: brass, bronze and aluminum foundry.

Clayton & Lambert Manufacturing Company, 10629 Knodell avenue, Detroit, Mich., manufacturer of blow torches, metal stampings, etc., has awarded contract to the Wisconsin Bridge & Iron Company, Penobscot Building, for a new one-story machine shop to cost $35,000. This concern operates the following departments: brass machine shop, tool room, grinding room, brazing, stamping, tinning, soldering, polishing, lacquering.

C. G. Everson & Company, manufacturers of electric light fixtures, water coolers and filters, 70 West Lake street, Chicago, Ill., have leased the five-story and basement building at the northeast corner of Erie and Green streets, where they will move their manufacturing equipment. This concern operates the following departments: brass machine shop, tool room, spinning, brazing, plating, japanning, soldering, polishing, lacquering.

The Metal Ware Corporation, Two Rivers, Wis., manufacturing aluminum utensils and other drawn-ware, has increased its capital stock from $300,000 to $350,000 to finance extensions of the plant and business. Details are now being worked out. R. Koenig is president and M. J. Gaffney, secretary and treasurer. This concern operates the following departments: tool room, grinding room, spinning, plating, japanning, stamping, polishing, lacquering.

The Sanford Riley Stoker Company, Worcester, Mass., and the **Ground Coal Engineering Company** (formerly of Chicago, Ill.) announce the formation of a corporation for the manufacture and installation of pulverized coal apparatus to be known as the Ground Coal Engineering Corporation with headquarters at Worcester, Mass. R. Sanford Riley, who is also president of the Riley Stoker Company, is president of the new corporation and M. W. Arrowood is vice-president and executive engineer.

The National Brass Company, Grand Rapids, Mich., has started the erection of a one-story addition, 45 x 330 ft., at Evergreen and Madison avenues. There will be installed in this building, both iron and brass foundries and the concern is in the market for foundry equipment and electrical equipment. This firm operates the following departments: brass, bronze and aluminum foundry, tool room, grinding room, casting shop, cutting-up shop, spinning, plating, stamping, soldering, polishing, lacquering.

At a meeting of the stockholders of **Handy & Harman,** 59 Cedar street, New York, held on April 19, 1923, the following were elected directors: John F. Harman, Parker D. Handy, Harry H. DeLoss, William B. Swell, Walter H. Bennett. At a meeting of the newly elected board of directors, held on April 25th, John F. Harman was elected chairman of the board; Parker D. Handy, president; C. W. Handy, G. C. Gerrish and G. H. Niemeyer, vice-presidents; J. L. Brush, treasurer; C. W. Handy, secretary. H. H. DeLoss, who has been associated with the corporation for 20 years, is retiring from active participation in the management but will continue to serve upon the board of directors.

INCORPORATIONS

The Quality Aluminum Company, Waukesha, Wis., is in process of organization by A. C. Pankratz, 505 Lake avenue, to manufacture aluminum and alloy metal castings. Tentative plans are being prepared for a one-story brick and steel casting shop and machine roof, 85x200 ft., estimated to cost, with equipment, about $85,000. This firm operates an aluminum foundry.

The Harvey Metal Corporation, 105 West Monroe street, Chicago, Ill., has incorporated for $100,000 and 2,500 shares no par value. It will do forging, casting, hot pressing, machining, and finishing of metals, metalware, etc. Incorporators: Wm. C. Mason, Harold Harvey, H. C. Mullins. This firm operates the following departments: brass machine shop, tool room, cutting-up shop, galvanizing, plating, brass, copper and aluminum forging, stamping. Polishing and plating equipment is required.

The Weldaware Products Company, 656 West Twelfth street, Erie, Pa., has been organized to manufacture aluminum kitchenware and kindred aluminum articles. It has acquired a plant which is now being fitted up for work and will be ready for production within a week. All manufacturing will be done in its own plant, which is sufficiently well equipped for present requirements. This firm operates the following departments: brass machine shop, tool room, grinding room, spinning, brazing, plating, stamping, tinning, polishing.

BUSINESS TROUBLES

It has been announced in the daily press that the McNab & Harlin Company of Paterson, N. J., is in the hands of a receiver.

Federal Judge Mack appointed Samuel D. Leidesdorf receiver in equity for the McNab & Harlin Manufacturing Company, valve and steam fitting manufacturers, of Paterson, N. J., and New York city, under a bond for $50,000. The Youngstown Sheet and Tube Company is suing for $9,056 and the petition alleges the company has liabilities of more than $898,000. The assets are not given. The plant will be continued in operation.

ANACONDA COMPANY

The Anaconda Copper Mining Company, for the year ended December 31, 1922, reports gross revenue of $175,450,384, the largest for any year in the history of the company, exceeding even the years of the war. The increase, however, was due to the acquisition of the properties of the American Brass Company in the early part of 1922. The total of $175,450,384 compares with a total of $33,113,231 in 1921. After payment of all operating expenses and reserves for Federal taxes, the company reports net operating income of $11,432,044, against a net operating deficit of $6,257,042 the year before. After providing for reserves for depreciation, bond interest and writing-off of loss in connection with suspended mining operations during the first quarter of the year, the company reports a balance of $3,539,239 available for the 3,000,000 shares outstanding of capital stock of $50 a share par value, or the equivalent of almost $1.18 a share. In 1921, after all deductions for interest, reserves and other charges, the company reported a deficit of $17,061,189.

The consolidated general balance sheet of the Anaconda and its subsidiaries, as of December 31, 1922, shows total assets of $343,892,781, against total assets of $273,262,605 at the close of the previous year. Net current assets were given at $96,873,711 at the close of last year, divided as follows: Supplies, $19,258,305; metals and manufactured products in process, $43,672,613, and accounts receivable and cash assets, $33,942,613. Net current liabilities consisting mainly of accounts and wages payable and taxes and interest accrued, totaled $44,051,713. The profit and loss surplus on December 31, 1922, amounted to $71,284,784.

The present price of copper, about 17 cents per pound, is high only by comparison with the recent very low price. Copper is selling relatively at less than any basic commodity. The average cost per pound to the principal producers in 1913 was 9.9 cents, while the average selling price for that year was 15.7 cents, indicating an average profit of 5.8 cents—a margin normally considered as representing only a fair return. The average cost of copper produced in the United States in 1921 was 14.34 cents, while the average market price was only 12.7 cents per pound, an average loss of 1.64 cents per pound. In order to yield a normal profit for the industry, as measured by pre-war years, copper should today be selling at more than 20 cents per pound.

MARVIN & COMPANY

The firm of Marvin & Company, Ltd., of America, 30 Church street, New York City, has just been organized to take care of the various interests of M. E. Marvin and Marvin & Company, Ltd., both of Rio de Janeiro. M. E. Marvin is recognized as one of the largest operators in ferrous and non-ferrous metals in South America. Operating under the name of M. E. Marvin & Company, Ltd., of Rio de Janiero, he runs one of the largest nail, wire, rod, copper and brass mills in South America. They are manufacturers of brass products for shoe factories, such as shoe nails of copper and brass, etc., an extensive wire mill and hinge plant, and one of the largest metal smelting, refining and manufacturing plants in South America. They also carry in stock large quantities of all grades of metals in all shapes, sizes, etc., such as sheets, rods, etc., being very large importers, and they operate extensively in iron and steel products.

Marvin & Company, Ltd., of America, have a backing of some of the largest interests in America. They are representatives in South America of G. Amsink & Company, 90-96 Wall street; Allied Machinery Company, of New York, and the American International Corporation.

The New York office is in charge of J. A. Bruderman, S. N. Fox and David Bregman, the first two having been connected for some time with the Great Western Smelting & Refining Company.

BRITISH WAR MEDALS

More than 14,000,000 medals for service in the war have been issued by the Medal Branch of the British War Office. Over 1,000,000 of them have been bestowed upon troops from the Overseas Dominions. The various issues comprise the "1914" stars and clasps, "1914-15" stars and 4,700,000 British War Medals and 4,550,000 Victory medals. To members of native labor corps 110,000 bronze British War Medals have been issued. For gallant and meritorious service there have been awarded 41,000 Military Crosses, 33,000 Distinguished Conduct Medals, 129,000 Military Medals, 29,000 Meritorious Service Medals, and 126,000 Emblems to those mentioned in despatches. The silver war badges given to individuals discharged from the service on ac-

count of wounds or sickness numbered 1,150,000. The ribbons accompanying the stars and medals amount to a collective length of over 1,800 miles. Practically the whole of the medals were made after the war in the national munition factories and other Government establishments.

ANALYSIS OF ALUMINUM AND ITS ALLOYS

In connection with its investigations in aluminum metallurgy, the Bureau of Mines has been required to develop methods of analysis for aluminum and aluminum alloys, and research work has been carried out to develop methods for the determination of aluminum oxide and aluminum in commercial aluminum and its light alloys. The purpose of the investigation, which includes now principally the collation and checking up of methods, was to prepare a compendium of methods that could be employed in practice.

Methods have been developed for the direct determination of aluminum in commercial aluminum pig and in aluminum alloys and for aluminum oxide in these materials, and the results are in process of being written up. The ordinary methods of analysis for copper, silicon, iron, zinc, tin, nickel, titanium, carbon and other impurities and additive elements contained either in aluminum or its light alloys are in process of being checked, and a bulletin covering the subject is in process of being written.

QUICKSILVER OUTPUT STILL LOW

Preliminary figures showing the production of quicksilver in the United States in 1922, compiled by F. L. Ransome, of the United States Geological Survey, Department of the Interior, give a total of 6,497 flasks, of 75 pounds net, as compared with 6,339 flasks in 1921, which was the smallest annual output in the 72 years of recorded production of domestic quicksilver. In 1922 California produced 3,494 flasks, Texas 2,725 flasks, and Nevada and Oregon 278 flasks.

The average price of quicksilver in 1922 per flask of 75 pounds, as calculated from quotations by the Engineering and Mining Journal-Press, was $58.95 for New York and $57.78 for San Francisco. The price declined from $51 New York and $50 San Francisco early in January, to $48 New York and $47.30 San Francisco in February. From the first of March the rise was fairly steady to $74 New York and $71.30 San Francisco at the end of the year.

The tariff act of 1922, which went into effect on September 21, placed a duty on imported quicksilver, of 25 cents a pound equivalent to $18.75 a flask. At the end of the year the directors of the great Almaden mine, in Spain, where extensive improvements have been in progress, reduced the price of quicksilver at the mine to the equivalent of about $45 per flask.

No important additions to known resources of domestic quicksilver were made during the year 1922, but the effect of the new import duty will probably be seen in a moderate increase in production in 1923.

PIPE, BAR AND SHEET LEAD IN 1921

The Department of Commerce announces that according to reports made to the Bureau of the Census the value of products of establishments engaged primarily in the manufacture of lead pipe and bar and sheet lead amounted to $10,474,000, in 1921 as compared with $17,174,000 in 1919, and $7,431,000 in 1914, a decrease of 39 per cent from 1919 to 1921, but an increase of 4 per cent for the seven-year period of 1914 to 1921.

This industry includes establishments manufacturing sheet, bar, block, and milled lead and pipe, traps, bends, and similar lead products. Establishments smelting the ore and refining the bullion are not included, however. A report has recently been issued relative to the smelting and refining of lead during 1921.

Of the 29 establishments reporting in 1921, 5 were located in Pennsylvania; 3 in New York; 2 each in Massachusetts, Ohio, Rhode Island and Wisconsin, and 1 each in California, Colorado, Georgia, Illinois, Iowa, Maryland, Michigan, Minnesota, Missouri Nebraska, New Jersey, South Carolina and Washington.

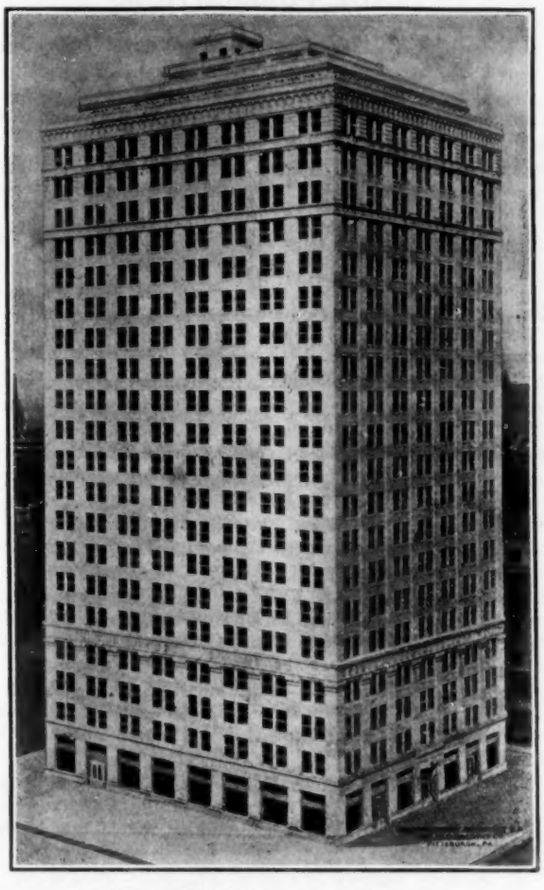
In September, the month of maximum employment, 953 wage earners were reported, and in January, the month of minimum employment, 812—the minimum representing 85 per cent of the maximum. The average number employed during 1921 was 882 as compared with 852 in 1919 and 585 in 1914.

BRASS PIPING THROUGHOUT BUILDING

For the first time in the history of the building industry in Philadelphia, copper and brass piping are being used throughout in the construction of an office building. Hitherto, brass piping has been installed often enough, but only when corrodible substitutes had failed, with resulting inconvenience to occupants and double expense to owners.

The structure in question will be known as the Atlantic Building. It is now almost completed, and will be the permanent home of the Atlantic Refining Company. Situated in the heart of the business section, at the northwest corner of Broad and Spruce Streets, Philadelphia, this twenty-story skyscraper fronts 118 feet on Broad street and 139 feet on Spruce street.

Seamless drawn copper and brass pipe ranging from six inches down to one-half inch, will be used throughout in both



ATLANTIC BUILDING, PHILADELPHIA, PA.

hot and cold water systems respectively, a total of approximately 33,500 feet being required.

Copper is being used for all sheet metal work. The walls and roof will be copper-flashed, and copper flashings will also line the walls between the roof and the coping and underneath the coping to the outer edge of the wall. The louvres around the stack on the vent shaft and toilet vents, and the skylights over the machinery room, are also of copper. Large copper pans have been installed underneath the huge water

tanks. In all, it is estimated that about 15,000 pounds of copper will be used.—Bulletin of the Copper & Brass Research Association.

METAL STOCK MARKET QUOTATIONS

	Par	Bid	Asked
Aluminum Company of America	$100	$475	$525
American Hardware Corporation	100	55	60
Anaconda Copper	50	46⅝	46¾
Bristol Brass	25	13	18
International Nickel, com	25	13½	13⅝
International Nickel, pfd	100	76½	77¾
International Silver, com	100	50	...
International Silver, pfd	100	107	111
National Conduit & Cable	100	¾	1
National Enameling & Stamping	100	66¼	66½
National Lead Company, com	100	122	123
National Lead Company, pfd	100	111	112
New Jersey Zinc	100	172	175
Rome Brass & Copper	100	115	130
Scovill Manufacturing Company, new	...	170	180
Yale & Towne Manufacturing Co., new	...	62	64

Corrected by J. K. Rice, Jr., Co., 36 Wall Street, New York.

TRADE PUBLICATIONS

Lead Pipe. A booklet issued by the Hoyt Metal Company, St. Louis, Mo., giving data on lead pipe.

Spartan Type Metals. A circular issued by Merchants & Evans Company, Philadelphia, Pa., on their Spartan type metal.

Brass Pipe Plumbing. A folder issued by National Brass & Copper Company, Lisbon, Ohio, stating the merits of brass pipe plumbing.

Type Metals. A post card sent out by I. Shonberg, Inc., 122 Flushing avenue, Brooklyn, N. Y., listing the type metals made by this concern.

"Boiling With Gas." A folder issued by the Combustion Utilities Corporation, 24 State street, New York, on their improved caldron furnace.

"Abrasive" Grinding Wheels. A booklet issued by the Abrasive Company, Philadelphia, Pa., illustrating and describing their "Abrasive" grinding wheels.

Welded Joints. A booklet issued by the Linde Air Products Company, New York, relating some experiences in the use of oxy-acetylene welded joints in pipe lines.

Buffalo Brand Vent Wax. A folder issued by George F. Pettinos, 1206 Locust street, Philadelphia, Pa., on Buffalo brand vent wax which is used for venting cores.

"Keep Them Out!" A booklet issued by the Copper & Brass Research Association, 25 Broadway, New York, telling why copper or bronze screening is better and cheaper than iron.

Richards Rotary Plater—Bulletin No. 103. Issued by Lasalco, Inc., 2828 La Salle street, St. Louis, Mo., illustrating and describing their latest improved single unit motion plating machine.

"Hisey" Portable Electric Drills and Reamers. Bulletin No. 106, issued by the Hisey-Wolf Machine Company, Cincinnati, Ohio, illustrating and describing their electric drills and reamers.

U. S. Plating Barrels—Bulletin No. 101. Issued by the U. S. Galvanizing & Plating Equipment Corporation, 32 Stockton street, Brooklyn, N. Y., illustrating and describing their plating and galvanizing barrel apparatus.

Assembly Problems. A folder issued by Edwin B. Stimpson Company, 70 Franklin avenue, Brooklyn, N. Y., on some of the standard machines they are making for automatically feeding and setting split rivets, eyelets, lacing hooks, grommets, etc.

"Wear-Ever" Production Tools—Catalogue No. 33. Issued by Scully-Jones & Company, 2012 West 13th street, Chicago, Ill. This catalogue thoroughly describes the advantages and adaptability of each tool listed and is particularly valuable to the practical man.

Trade Marks. Third edition. A booklet issued by Richards & Geier, 277 Broadway, New York city, defining trade-marks and those imperishable principles of honesty and fair dealing which constitute the foundation of the law of trade-marks and unfair competition.

Methanol. A booklet issued by the National Wood Chemical Association on the new name for wood alcohol. Dr. W. A. Hamor, Assistant Director of the Mellon Institute of Industrial Research of the University of Pittsburgh, Pa., helped to prepare this booklet.

"American" Dust Arresters. Bulletin No. 432. Issued by the American Foundry Equipment Company, 366 Madison avenue, New York. This bulletin explains the construction of the cloth screen type arrester, its operation and advantages together with a table of standard sizes.

Year Book 1923. Issued by the American Foundrymen's Association, Marquette Building, Chicago, Ill. A part of the contents is as follows: Past Presidents, Annual Conventions, Vice-presidents and their terms of office, Treasurers, Secretaries, By-Laws, List of Members, etc.

"Make it of Zinc." A bulletin issued by the American Zinc Institute, Incorporated, New York city. It is the 1922 Annual Meeting Number. Contents are as follows: Annual Meeting Index, Annual Meeting Register, Board of Directors, Officers, Committees, Membership Application Blank.

Portable Timing Device. Bulletin No. 46053, issued by the General Electric Company, Schenectady, N. Y., describing their Portable Timing Device which consists of an encased clock, to be used with a standardized clock as a means of secondary timing, to supplant the stop watch.

Watson Multi-Speed Motor. A bulletin issued by the Louis Allis Company, Milwaukee, Wis., describing and illustrating the possibilities of the Watson Multi-Speed motor. Textile mills, foundries, machine shops, bottling plants, wood-working factories, are but a few of the many industries now using these machines.

Wm. M. Webster, Commissioner of the **National Association of Brass Manufacturers,** 139 N. Clark street, Chicago, Ill., has a quantity of 1920 official catalogues that jobbers and manufacturers may desire in compiling a new catalogue, distribution among the trade, or for other purposes, and while they last they will be closed out at 5 cents per copy.

Plating and Polishing Supplies and Material—Catalogue No. 12. An illustrated catalogue and price list, issued by the Crown Rheostat & Supply Company, 31-33 South Desplaines street, Chicago, Ill., of plating and polishing supplies, dynamos, rheostats, platers' chemicals, polishing and buffing lathes, buffing compositions, polishing material and mechanical plating outfits. A very attractive and complete catalogue.

Handling Material. Pamphlet No. 54 issued by the National Safety Council, 168 No. Michigan avenue, Chicago, Ill. The pamphlet is divided into the following main divisions: power trucks, hand trucks, piling material, handling by hand and safe habits of work, each of which is again subdivided into paragraphs dealing with the different types of equipment used and the different methods employed in handling various types of material.

Year Book American Engineering Standards Committee, 1923. A book issued by the American Engineering Standards Committee, 29 West 39th street, New York, showing that great progress has been made during the last year in standardization projects affecting mechanical engineering and the metal industries. The report shows that at the end of the year 121 industrial standardization projects were definitely under way or had been completed and the standards approved.

Patents-Law and Practice. Second edition. A booklet issued by Richards & Geier, 277 Broadway, New York city, designed to serve as a convenient handbook, presenting in concise form for ready reference the features most necessary to be available to lawyers, manufacturers and inventors to enable them readily to understand the leading points of the law and practice on this important subject matter, and to take the necessary steps to secure protection for this class of property.

Review of the Wrought Metal Market

Written for The Metal Industry by J. J. WHITEHEAD, President Whitehead Metal Products Company of New York, Inc.

As a general rule throughout the trade, there prevails a feeling of relief and satisfaction that the prices of copper and zinc have apparently reached the peak and receded slightly. Much anxiety was expressed when the copper prices passed 17c and it was felt in many quarters that if copper was run up to 20c as was predicted, the ultimate effect would be disastrous. The unfortunate situation existing at the end of 1920 is still fresh in the minds of most people and there has been a very general determination not to get caught in a similar position if it could possibly be avoided. The reaction wihch has recently occurred in the raw metal prices has, therefore, been for the most part, regarded as a healthy one, and there is not, at this time, any great feeling of alarm concerning it. There has not as yet been any change in the price of fabricated metals, such as sheet, rod, tube, etc., as the decline of raw material prices has been slight and hardly enough to absorb some recent labor increases that were made by various mills.

There has been a slightly noticeable falling off in orders in some departments, but this is taken only as showing a desire on the part of consumers to wait for some indication of the probable future course of the market before placing further commitments. The mills are still very far behind on their orders and are not greatly worried over the situation from any angle.

Other metals such as nickel alloys and monel metal are in very great demand, and the delivery position, while still somewhat unsatisfactory, is improving in comparison with what it has heretofore been. Taking the entire situation as a whole it is felt that the conditions of the metal business are sound.

Metal Market Review

Written for The Metal Industry by METAL MAN

COPPER

Although domestic consumption of copper continues at a heavy rate per month, market conditions weakened perceptibly recently with pressure to sell by independent holders at pronounced concessions. Several million pounds were liquidated at gradually receding prices during the end of April which carried the market a full half cent per pound below the selling level of a short time ago. During the last half of April sales of electrolytic were made all the way from 16¾c. to 16¼c. The large brass and copper manufacturers are covered pretty well for the next six weeks. Demand is consequently comparatively dull for early shipment. Producers generally refrained from cutting prices to the point accepted by outside sellers. There is decidedly less resale copper available as we go to press, but the market has not yet recovered from the reaction in prices which had so much to do with the unsettlement of the situation.

The market has receded from 17¼c.@⅜ cent within less than a month to 16½@⅝, delivered, and to about 16¼c. at refinery. Main factories are in position to go along a few weeks longer without coming into the market heavily. The hesitation of buyers is probably temporary. If further receding tendency does not develop it is thought new orders will appear some time in May.

ZINC

Recent movements and developments in the zinc market have been to the advantage of buyers, but notwithstanding this fact demand has tapered off to a pronounced extent for both prompt and future deliveries. The rate of consumption, however, is large and the statistical position appears to be good. Producers are not heavily loaded up with unsold stocks, but recent market weakness is an indication that any further increase in output would probably result in lower prices. A steadier market tone was apparent lately, but buyers continued a cautious policy. Sheet rolling companies made a recent reduction of 35 cents per 100 lbs. in the base price of sheet metal, making the basis price now 9.65c. f. o. b. manufacturers' works. Slab zinc quotes at 6.80c. East St. Louis, with futures 5 to 10 points lower. Consumers are expected to come into the market more freely soon.

TIN

American statistics reveal a larger domestic distribution of tin than anticipated, with deliveries of 6,775 tons for the month of April. These deliveries are the largest since December, 1919, when they amounted to 6,965 tons. Domestic stocks on April 30 were 3,577 tons, of which 1,977 tons were in store and 1,600 tons landing. The immediate effect of the favorable showing for last month was reflected in a firmer market tone at London and New York.

Domestic consumers have been fairly well covered on nearly all requirements and lately were inclined to reduce fresh buying to a minimum. It was impossible, therefore, to maintain the market at the high levels touched a few weeks ago. There was special interest taken in the recent announcement that the Far East Pool holdings of some 17,600 tons of tin were to be gradually liquidated. Release of these stocks at the rate of around 800 tons per month will add a substantial tonnage to the regular supplies.

During the month of April there was a decrease in total visible supply of 2,506 tons, compared with a decrease in the previous month of 535 tons. The total visible supply on April 30 was 22,116 tons, against 24,622 tons on March 31, 1923. The market on May 1 was 45⅛c. for spot Straits, with futures ranging from 45⅛c. to 45½c. for June, up to 45¾c. for August and September. Since then there has been further signs of increased firmness at London and New York. Consuming demand, however, is on a moderate scale. While the statistical position is regarded as rather favorable, there is considerable uncertainty over the course the market may take during the next two months. Chinese No. 1 tin is quoting about 1c. per pound below Straits, and Banka and Extra Refined at about ½c. below Straits.

LEAD

The upward price tendency in lead came to a halt recently when reverse action was taken by the leading producing interest on April 19 in reducing the price ¼c. per pound to the New York basis of 8 cents. The market had an unbroken series of advances in the official price from 4.40c. in August, 1921, to 8.25c. in first half of March, 1923. During the last 16 months the official price of pig lead was advanced 26 times and reduced twice. The current rate of duty at 2½c. per pound on foreign lead has contributed its good share in keeping prices at the present high level.

A further reduction in price of pig lead was made on April 30 by the American Smelting & Refining Company to 7.75c., New York basis. The E. St. Louis market also declined to 7.60c. for spot delivery. Surplus stocks are still light and consumption is on a large scale. However, the trade looks for some gain in output, which has every reason to be stimulated by current high prices. Market rules quiet, but steady.

ALUMINUM

The aluminum market has demonstrated its ability to maintain the high prices now ruling. A steady demand was maintained through April, and manufacturers have a regular outlet for their product at the increased figures now quoted. Foreign origin aluminum is held at 27c. for 99% plus, and the 98-99% grade quotes 26c. The Aluminum Company of America makes no open quotations. Domestic production of aluminum in 1922 had an estimated total value of $13,622,000, an increase of 25% over the value in 1921.

QUICKSILVER

A relaxing tendency is apparent in the market for quicksilver, with price quoted at $69 to $70 per flask of 75 pounds. Domestic production in 1922 has been recently announced by official sources as being 6,497 flasks, compared with 6,339 flasks in 1921. The

tariff in force since September 21 placed a duty of 25 cents a pound, equivalent to $18.75 a flask, on the foreign article. Spain and Italy, also England, are depended upon for a good percentage of supplies needed in this country. A softer tone has developed lately, with reports that prices have been shaded below $68 per flask recently. Offerings to arrive are quoted at even lower levels.

PLATINUM

Strength has developed in the platinum market owing to a steady demand. Offers are made on the basis of $116 an ounce, which compares with about $112 a month ago.

SILVER

Approach of the time when the government will complete its purchases of silver under the Pittman Act is drawing special attention to the probable developments which will affect the bullion market in the near future. Purchases under the Pittman Act to date aggregate 182,816,511 ounces, leaving a remainder of 25,805,545 ounces to be delivered under that agreement. While domestic production has been absorbed by the Treasury at $1 an ounce, silver consumers have been able to buy the product of Mexico, Canada and other foreign countries at prices ranging around 66c. to 67¾c. per ounce lately. It is problematic what effect the discontinuance of government purchases will have on the commercial price of silver in the open market. Demand from India and China is a strong controlling factor, and requirements from the Orient will be based on conditions in the Far East, and prices will be determined by the absorbing power of world consumption in the Arts and for coinage requirements. The outlook is full of puzzling possibilities. India has been a buyer in this country lately on a substantial scale.

ANTIMONY

Demand for antimony has turned distinctly dull, and the market in consequence has receded to the basis of 7.75c. duty paid for Chinese regulus of 99% analysis. This price could be shaded for future shipments of 25 tons or more. Offerings of China shipments afloat were heard of at 5.75c., c. i. f. in bond, against 6.25c. some time ago. Much cheaper metal, however, is on the way and nearly due, which places consumers in a comfortable position as to supplies.

OLD METALS

Scrap metal dealers have felt the effect of the recent declines in lead and copper. The white metals also shared in the softer tendency. Quietness has naturally settled upon this market, therefore, owing to the easier situation in the primary metals. Pressure to sell was in evidence in several quarters of the trade, but dealers will have a renewal of active interest when more settled conditions are established. Dealers quote as buying prices, crucible copper of first quality, 13¼c. to 13¾c.; new brass clippings, 9c. to 10c.; heavy old brass, 7c. to 7¼c.; light brass, 6c. to 6¼c.; heavy lead, 6¼c. to 6½c.; battery lead, 3½c. to 4c., and old zinc scrap, 4¾c. to 5c. Aluminum clippings hold up unusually well at 20c. to 21½c. All quotations are liable to change from day to day.

WATERBURY AVERAGE

Lake Copper—Average for 1922, 13,844—January, 1923, 14,875—February, 15.75—March, 17.25—April 17.125.

Brass Mill Zinc—Average for 1922, 6.283—January, 1923, 8—February, 8—March, 8.70—April, 8.25.

Daily Metal Prices for the Month of April, 1923

Record of Daily, Highest, Lowest and Average

Metal Prices for May 4, 1923

Date	2	3	4	5	6	9	10	11	12	13	16	17	18
Copper (f. o. b. Ref.) c/lb. **Duty Free**													
Lake (Delivered)	17.375	17.375	17.375	17.375	17.375	17.375	17.375	17.375	17.25	17.25	17.25	17.25	17.00
Electrolytic	17.125	17.125	17.125	17.125	17.125	17.125	17.00	16.875	16.75	16.75	16.75	16.75	16.875
Casting	16.875	16.875	16.875	16.875	16.875	16.875	16.75	16.75	16.625	16.50	16.50	16.50	16.625
Zinc (f. o. b. St. L.) c/lb. **Duty 1¼c/lb.**													
Prime Western	7.75	7.75	7.65	7.50	7.50	7.40	7.45	7.50	7.45	7.50	7.45	7.35	7.30
Brass Special	7.95	7.75	7.80	7.70	7.70	7.55	7.65	7.65	7.60	7.60	7.55	7.50	7.45
Tin (f. o. b., N. Y.) c/lb. **Duty Free**													
Straits	46.875	47.75	46.875	46.50	46.875	46.625	46.50	47.50	46.75	46.50	46.00	45.375	44.75
Pig 99%	46.125	46.00	45.00	44.75	45.00	44.75	44.75	45.75	45.00	44.875	44.125	43.625	43.50
Lead (f. o. b., St. L.) c/lb. **Duty 2¼c/lb.**	8.25	8.25	8.25	8.20	8.20	8.20	8.20	8.20	8.20	8.20	8.20	8.15	8.10
Aluminum c/lb. **Duty 5c/lb.**	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00
Nickel c/lb. **Duty 3c/lb.**													
Ingot—Internat. Nick. Co.	29	29	29	29	29	29	29	29	29	29	29	29	29
Outside Spot	29	29	29	29	29	29	29	29	29	29	29	29	29
Electrolytic (Internat. Nick. Co.)													
Ni.—99.80 contam. impur.—14	32	32	32	32	32	32	32	32	32	32	32	32	32
Brit.-Amer. Nick. Corp.													
Ni.—98.50 contam. impur.—.80	30	30	30	30	30	30	30	30	30	30	30	30	30
Antimony (J. & Ch.) c/lb. **Duty 2c/lb.**	8.875	8.875	8.75	8.75	8.75	8.70	8.60	8.60	8.50	8.50	8.375	8.375	8.375
Silver (foreign) c/oz. **Duty Free**	68.25	68.125	67.50	66.375	66.375	66.25	65.25	65.625	65.875	66.125	66.625	67.00	66.75
Platinum $/oz. **Duty Free**	112	115	115	115	115	115	118	118	118	118	118	118	118

Date	19	20	23	24	25	26	27	30	High	Low	Aver.	May 4
Copper (f. o. b. Ref.) c/lb. **Duty Free**												
Lake (Delivered)	17.00	17.00	17.00	17.00	16.875	16.75	16.75	16.625	17.375	16.625	17.143	16.75
Electrolytic	16.85	16.75	16.75	16.75	16.625	16.50	16.50	16.25	17.125	16.25	16.832	16.375
Casting	16.625	16.625	16.55	16.50	16.375	16.25	16.25	16.125	16.875	16.125	16.610	16.25
Zinc (f. o. b. St. L.) c/lb. **Duty 1¼c/lb.**												
Prime Western	7.20	7.20	7.15	7.10	7.05	7.00	6.90	6.85	7.75	6.85	7.333	7.10
Brass Special	7.30	7.30	7.25	7.20	7.15	7.15	7.05	7.00	7.95	7.00	7.469	7.20
Tin (f. o. b., N. Y.) c/lb. **Duty Free**												
Straits	44.625	44.25	45.125	45.50	44.375	44.125	44.75	44.75	47.75	44.125	45.827	45.125
Pig 99%	43.50	43.25	Nom.	Nom.	Nom.	Nom.	Nom.	Nom.	46.125	43.25	44.667	44.375
Lead (f. o. b., St. L.) c/lb. **Duty 2¼c/lb.**	7.90	7.90	7.85	7.80	7.85	7.85	7.75	7.60	8.25	7.60	8.052	7.45
Aluminum c/lb. **Duty 5c/lb.**	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.50
Nickel c/lb. **Duty 3c/lb.**												
Ingot—Internat. Nick. Co.	29	29	29	29	29	29	29	29	29	29	29	29
Outside Spot	29	29	29	29	29	29	29	29	29	29	29	29
Electrolytic (Internat. Nick. Co.)												
Ni.—99.80 contam. impur.—14	32	32	32	32	32	32	32	32	32	32	32	32
Brit.-Amer. Nick. Corp.												
Ni.—98.50 contam. impur.—.80	30	30	30	30	30	30	30	30	30	30	30	30
Antimony (J. & Ch.) c/lb. **Duty 2c/lb.**	8.25	8.125	8.125	8.125	8.00	8.00	7.875	7.75	8.875	7.75	8.394	7.75
Silver (foreign) c/oz. **Duty Free**	66.75	66.125	67.00	67.25	67.625	67.00	67.50	68.375	68.375	65.25	66.845	67.75
Platinum $/oz. **Duty Free**	118	118	118	116	116	116	116	116	118	112	116.524	116

Metal Prices, May 7, 1923

INGOT METALS AND ALLOYS

Brass Ingot, Yellow	12½to14
Brass Ingots, Red	15 to17½
Bronze Ingot	15½to18½
Bismuth	$2.85
Cadmium	$1.25
Casting Aluminum Alloys	21 to24
Cobalt—97% pure	$3.25
Manganese Bronze Castings	22 to35
Manganese Bronze Ingots	14 to18
Manganese Bronze Forging	33 to42
Manganese Copper, 30%	28 to45
Magnesium Metal	$1.25-1.50
Parsons Manganese Bronze Ingots	21½to23
Phosphor Bronze	24 to30
Phosphor Copper, guaranteed 15%	21½to26
Phosphor Copper, guaranteed 10%	21 to25
Phosphor Tin, guarantee 5%	48 to58
Phosphor Tin, no guarantee	46 to56
Quicksilver	$70-71
Silicon Copper, 10%	according to quantity 28 to35

OLD METALS

Buying Prices		Selling Prices
13 to13¼	Heavy Cut Copper	14 to14½
12¾to13	Copper Wire	13¾to14¼
10¾to11	Light Copper	12 to12½
10½to11	Heavy Machine Comp	12½to13
8 to 8½	Heavy Brass	10 to10½
6¼to 7	Light Brass	8 to 8½
8	No. 1 Yellow Brass Turnings	8½to 9
9½to10	No. 1 Comp Turnings	10¾to11¼
5¾to 6	Heavy Lead	6½to 6¾
4	Zinc Scrap	4½to 4¾
9½to10	Scrap Aluminum, Turnings	12 to12½
15½to16	Scrap Aluminum, cast alloyed	17½to18
16½to17½	Scrap Aluminum, sheet (new)	18½to19½
23½	No. 1 Pewter	27½
14½	Old Nickel anodes	16½
22½to24½	Old Nickel	26½to29

BRASS MATERIAL—MILL SHIPMENTS

In effect March 29, 1923

To customers who buy 5,000 lbs. or more in one order.

	Net base per lb. High Brass	Low Brass	Bronze
Sheet	$0.21¾	$0.23½	$0.25⅜
Wire	0.22¼	0.24	0.25⅞
Rod	0.20	0.24¼	0.26⅛
Brazed tubing	0.29¾	.....	0.35⅛
Open sea tubing	0.29¾	.....	0.35⅛
Angles and channels	0.32¾	.....	0.38⅛

To customers who buy less than 5,000 lbs. in one order.

	Net base per lb. High Brass	Low Brass	Bronze
Sheet	$0.22¾	$0.24½	$0.26¾
Wire	0.23¼	0.25	0.26⅞
Rod	0.21	0.25¼	0.27⅛
Brazed tubing	0.30¾	.....	0.36⅛
Open seam tubing	0.30¾	.....	0.36⅛
Angles and channels	0.33¾	.....	0.39⅛

SEAMLESS TUBING

Brass, 26½c. to 27½c. per lb. base.
Copper, 28c. to 29c. per lb. base.

TOBIN BRONZE AND MUNTZ METAL

Tobin Bronze Rod	23¾c. net base
Muntz or Yellow Metal Sheathing (14"x48")	21¾c. net base
Muntz or Yellow Rectangular Sheets other than Sheathing	22¾c. net base
Muntz or Yellow Metal Rod	19¾c. net base

Above are for 100 lbs. or more in one order.

COPPER SHEET

Mill shipments (hot rolled)	25½c. to 26½c.
From stock	26½c. to 27½c.

BARE COPPER WIRE—CARLOAD LOTS

19¼c. to 19½c. per lb. base.

SOLDERING COPPERS

300 lbs. and over in one order	23¾c. per lb. base
100 lbs. to 200 lbs. in one order	24¼c. per lb. base

ZINC SHEET

Duty, sheet, 15%. Cents per lb.

Carload lots, standard sizes and gauges, at mill, 9.65c. basis less 8 per cent. discount.

Casks, jobbers' prices	11c. to 11¾c.
Open casks, jobbers' prices	11½c. to 12¾c.

ALUMINUM SHEET AND COIL

Aluminum sheet, 18 ga. and heavier, base price	37c.
Aluminum coils, 24 ga. and heavier, base price	35c.
Foreign	45c.

NICKEL SILVER (NICKELENE)

Base Prices

Grade "A" Nickel Silver Sheet Metal

10%	Quality	28¾c. per lb.
15%	"	30c. per lb.
18%	"	31c. per lb.

Nickel Silver Wire and Rod

10%	"	31½c. per lb.
15%	"	35c. per lb.
18%	"	38c. per lb.

MONEL METAL

Shot	32
Blocks	32
Hot Rolled Rods (base)	40
Cold Drawn Rods (base)	46
Hot Rolled Sheets (base)	45

BLOCK TIN SHEET AND BRITANNIA METAL

Block Tin Sheet—18" wide or less. No. 26 B. & S. Gauge or thicker. 100 lbs. or more, 10c. over Pig Tin. 40 to 100 lbs., 15c. over 25 to 50 lbs., 17c. over, less than 35 lbs., 25c. over.

No. 1 Britannia—18" wide or less. No. 26 B. & S. Gauge or thicker, 500 lbs. or over, 8c. over N. Y. tin price; 100 lbs. or more, 10c. over Pig Tin. 50 to 100 lbs., 15c. over, 25 to 50 lbs., 20c. over, less than 25 lbs., 25c. over. Above prices f. o. b. mill.

SILVER SHEET

Rolled silver anodes .999 fine are quoted at from 71c. to 73c. per Troy ounce, depending upon quantity.

Rolled sterling silver 68c. to 70c.

NICKEL ANODES

85 to 87% purity	31½c.-34c. per lb.
90 to 92% purity	34c. -37c. per lb.
95 to 97% purity	36c. -39c. per lb.

Supply Prices, May 7, 1923

CHEMICALS

In Commercial Quantities—New York Prices

Acetone	lb.	.24½–.27
Acid—		
Boric (Boracic) Crystals	lb.	.12
Hydrochloric (Muriatic) Tech., 20 deg., Carboys	lb.	.02
Hydrochloric, C. P., 20 deg., Carboys	lb.	.08
Hydrofluoric, 30%, bbls.	lb.	.08
Nitric, 36 deg. Carboys	lb.	.06
Nitric, 42 deg. Carboys	lb.	.07
Sulphuric, 66 deg. Carboys	lb.	.02
Alcohol—		
Butyl	lb.	.35–.40
Denatured in bbls.	gal.	.36–.43
Alum—		
Lump, Barrels	lb.	.04
Powdered, Barrels	lb.	.04½
Aluminum sulphate, commercial tech	lb.	.02½–.03
Aluminum chloride solution	lb.	.22
Ammonium—		
Sulphate, tech., Barrels	lb.	.03¾
Sulphocyanide	lb.	.65
Argols, white, see Cream of Tartar	lb.	.27
Arsenic, white, Kegs	lb.	.16
Asphaltum	lb.	.35
Benzol, pure	gal.	.60
Blue Vitriol, see Copper Sulphate.		
Borax Crystals (Sodium Biborate), Barrels	lb.	.06
Calcium Carbonate (Precipitated Chalk)	lb.	.04
Carbon Bisulphide, Drums	lb.	.07
Chrome Green	lb.	.36
Cobalt Chloride	lb.	—
Copper—		
Acetate	lb.	.37
Carbonate, Barrels	lb.	.20
Cyanide	lb.	.46
Sulphate, Barrels	lb.	.06½
Copperas (Iron Sulphate, bbl.)	lb.	.02
Corrosive Sublimate, see Mercury Bichloride.		
Cream of Tartar, Crystals (Potassium bitartrate)	lb.	.27
Crocus	lb.	.15
Dextrin	lb.	.05–.08
Emery Flour	lb.	.06
Flint, powdered	ton	$30.00
Fluor-spar (Calcic fluoride)	ton	$75.00
Fusel Oil	gal.	5.50
Gold Chloride	oz.	14.00
Gum—		
Sandarac	lb.	.26
Shellac	lb.	.82–1.00
Iron, Sulphate, see Copperas, bbl.	lb.	.02
Lead Acetate (Sugar of Lead)	lb.	.13
Yellow Oxide (Litharge)	lb.	.12½
Mercury Bichloride (Corrosive Sublimate)	lb.	1.15
Nickel—		
Carbonate Dry	lb.	.40
Chloride, 100 lb. lots	lb.	.22½–.40
Salts, single, bbls.	lb.	.11½
Salts, double, bbl.	lb.	.10½
Parrafin	lb.	.05–.06
Phosphorus—Duty free, according to quantity		.35–.40
Potash, Caustic, Electrolytic 88-92% fused, drums	lb.	.09
Potassium Bichromate, casks	lb.	.11
Carbonate, 80-85%, casks	lb.	.06
Cyanide, 165 lb. cases, 94-96%	lb.	.65
Pumice, ground, bbls.	lb.	.02½
Quartz, powdered	ton	$30.00
Official	oz.	—
Rosin, bbls.	lb.	.03½
Rouge, nickel, 100 lb. lots	lb.	.25
Silver and Gold	lb.	.65
Sal Ammoniac (Ammonium Chloride) in casks	lb.	.08
Silver Chloride, dry	oz.	.86
Cyanide	oz.	—
Nitrate, 100 ounce lots	oz.	.46
Soda Ash, 58%, bbls.	lb.	.02½
Sodium—		
Biborate, see Borax (Powdered), bbls.	lb.	.06
Cyanide, 96 to 98%, 100 lbs.	lb.	.23
Hyposulphite, kegs	lb.	.04
Nitrate, tech. bbls.	lb.	.03
Phosphate, tech., bbls.	lb.	.03¾
Silicate (Water Glass) bbls.	lb.	.02
Sulpho Cyanide	lb.	.45
Soot, Calcined	lb.	—
Sugar of Lead, see Lead Acetate	lb.	.12–.13
Sulphur (Brimstone) bbls.	lb.	.02
Tin Chloride, 100 lb. kegs	lb.	.37
Tripoli	lb.	.03
Verdigris, see Copper Acetate	lb.	.37
Water Glass, see Sodium Silicate, bbls.	lb.	.02½
Wax—		
Bees, white ref. bleached	lb.	.55
Yellow, No. 1	lb.	.35
Whiting, Bolted	lb.	.02½–.06
Zinc. Carbonate, bbls.	lb.	.13–.17
Chloride, 600 lb. lots	lb.	.07
Cyanide	lb.	.37
Sulphate, bbls.	lb.	.03¼

COTTON BUFFS

Open buffs, per 100 sections (nominal).

12 inch, 20 ply, 64/68, cloth	base,	42.95
14 inch, 20 ply, 64/68, cloth	base,	53.40
12 inch, 20 ply, 84/92, cloth	base,	51.05
14 inch, 20 ply, 84/92, cloth	base,	68.80
12 inch, 20 ply, 88/96, cloth	base,	58.35
14 inch, 20 ply, 88/96, cloth	base,	78.60
Sewed Buffs, per lb., bleached and unbleached	base,	.60

FELT WHEELS

		Price Per Lb. Less Than 100 Lbs.	300 Lbs. and Over
Diameter—10″ to 16″	1″ to 3″	2.75	2.50
" 6″ 8″ and over 16″	1″ to 3″	2.85	2.60
" 6″ to 24″	Over 3″	3.15	2.80
" 6″ to 24″	½″ to 1″	3.75	3.50
" 4″ to 6″	¼″ to 3″	4.75	Any quantity.
" Under 4″	¼″ to 3″	5.35	

Grey Mexican or French Grey—10c. less per lb. than Spanish, above. Odd sizes, 50c. advance.